Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

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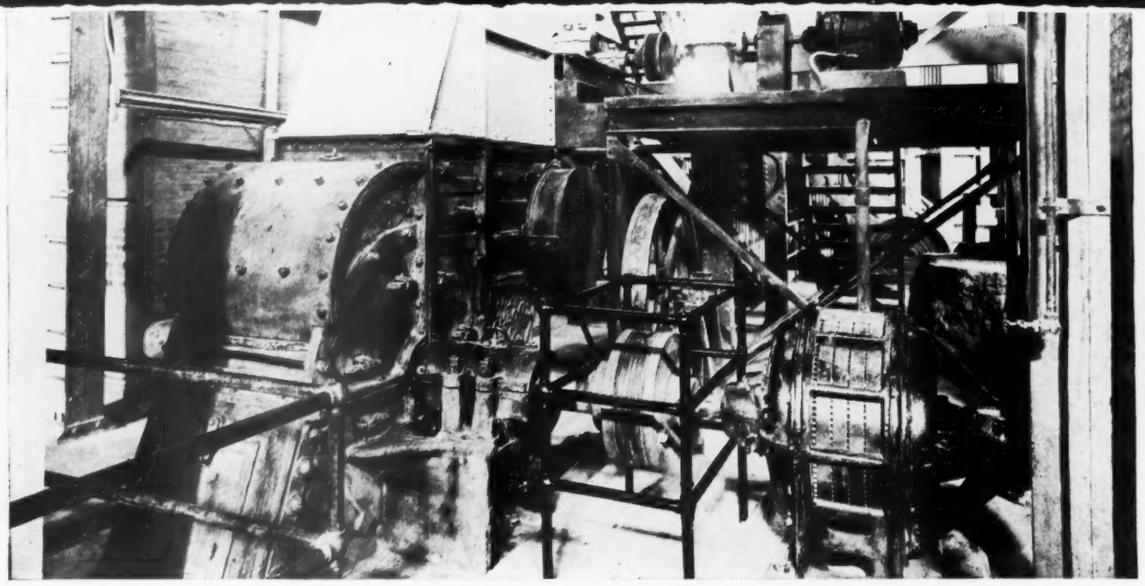
Two Williams "Non-Clogs" for Penn-Dixie Cement Corp.



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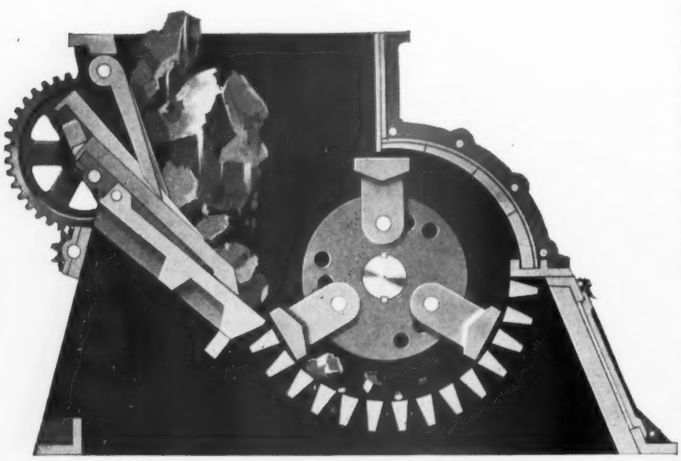

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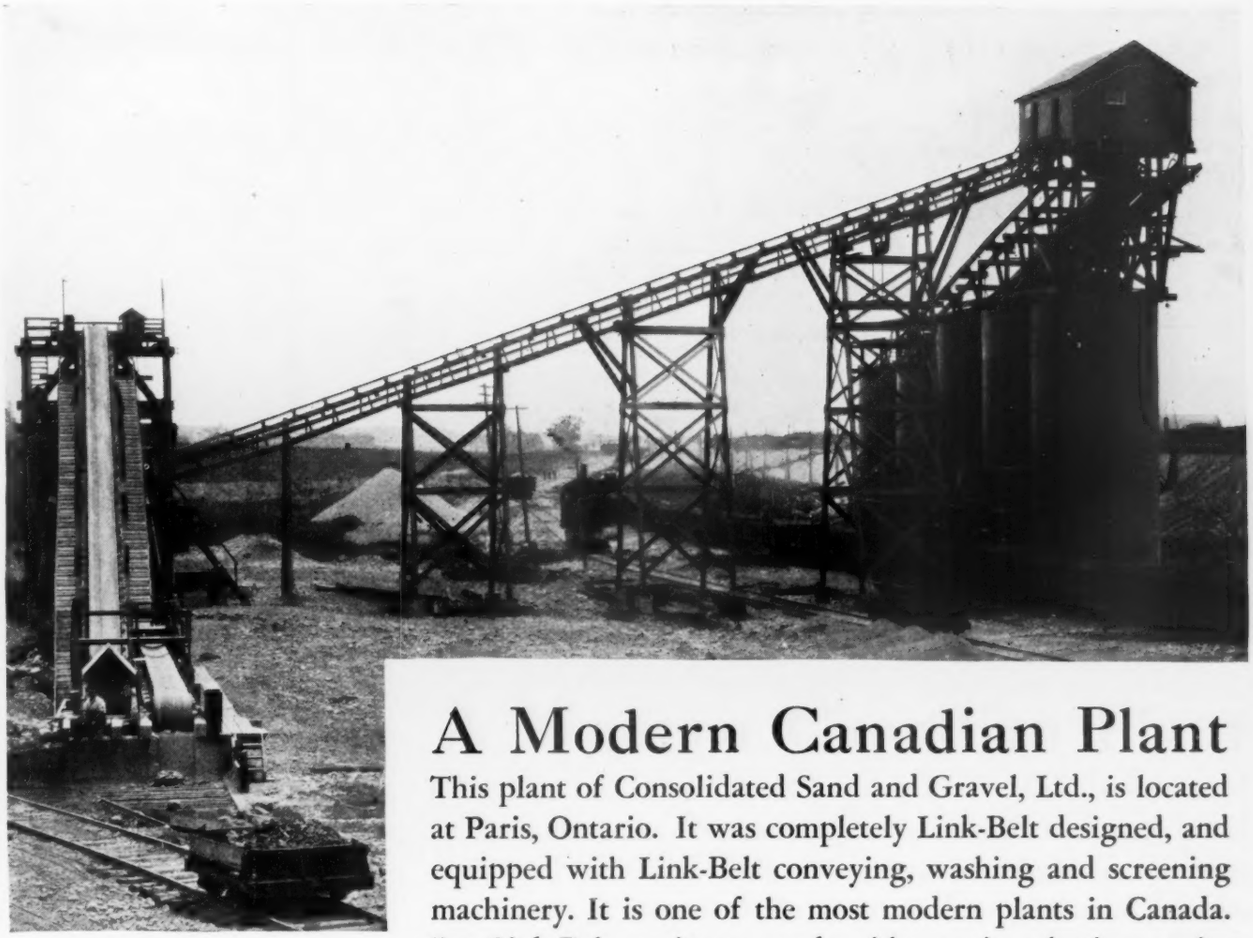

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Surge Bin Gives Flexibility to Crushing Plant Operation

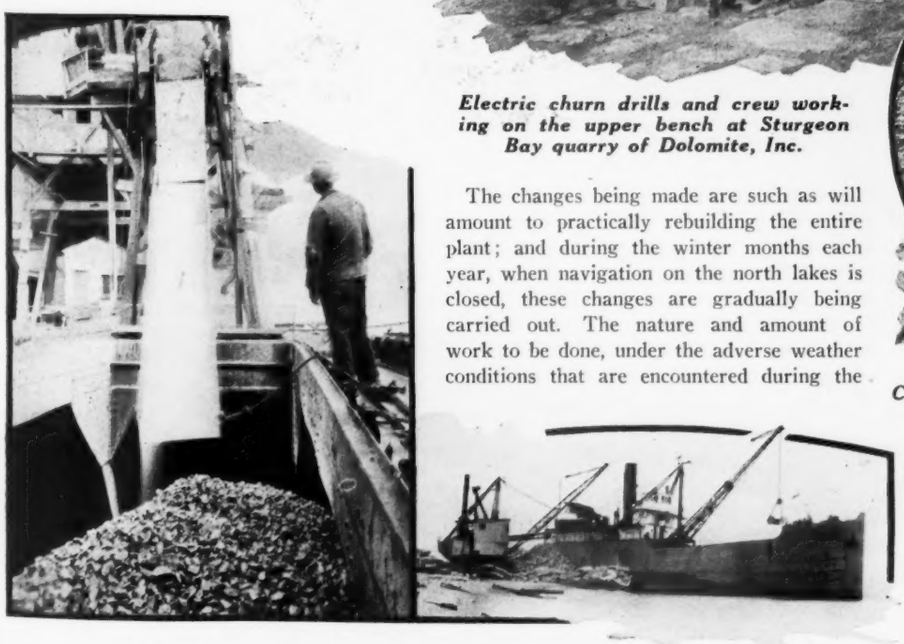
Sturgeon Bay Company Plant Has Other Novel Features Incorporated Into Practical Rebuilding of Entire Plant

IN THE JUNE 2, 1923, issue of ROCK PRODUCTS was described the then new crushed-stone plant of the Leathem D. Smith Co., at Sturgeon Bay, Wis. In January, 1928, Dolomite, Inc., of which H. P. Eells, Jr., 1501 Hanna Bldg., Cleveland, Ohio, is president, took over the operation of the old company's plant and quarry and, to keep step with modern methods of quarrying and milling practices, immediately started making changes of a major nature that will ultimately give the new company a thoroughly modern plant capable of producing 700 tons per hour of washed and graded crushed stone. Dolomite, Inc., that took over this plant, has another quarry at Maple Grove, Ohio, and directs the operations of both plants from the Cleveland offices. The Sturgeon Bay operation is under the name of Sturgeon Bay Co.

Electric churn drills and crew working on the upper bench at Sturgeon Bay quarry of Dolomite, Inc.

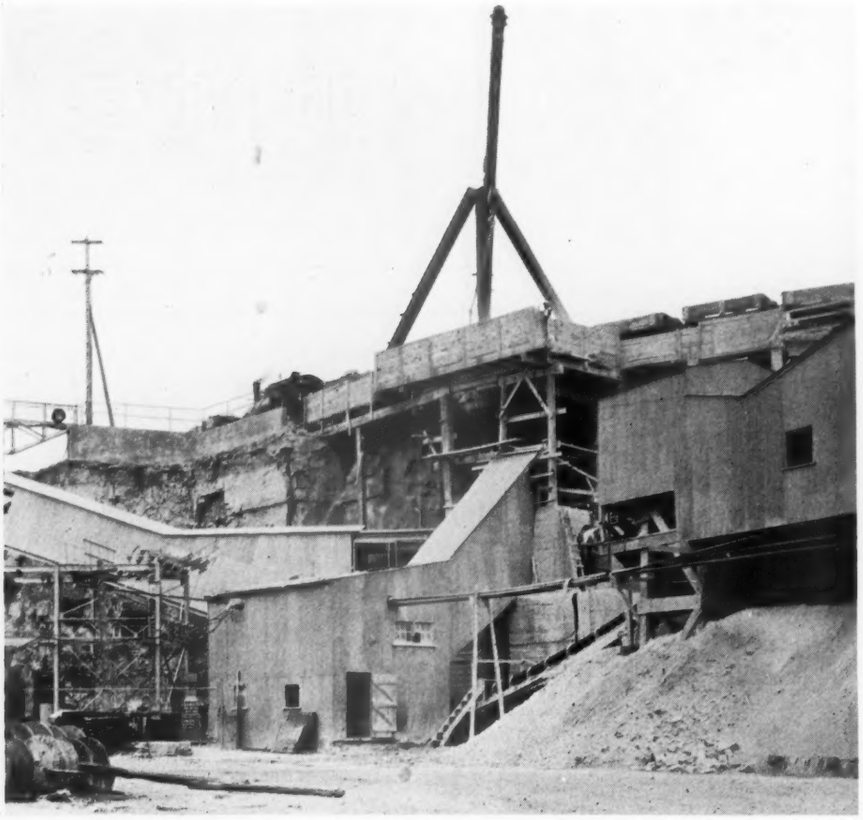
The changes being made are such as will amount to practically rebuilding the entire plant; and during the winter months each year, when navigation on the north lakes is closed, these changes are gradually being carried out. The nature and amount of work to be done, under the adverse weather conditions that are encountered during the winter months, will take at least one and perhaps two more years to get the entire layout installed.

Circle shows effect of a primary shot and how little secondary shooting is necessary



Above, feeding crushed rock into a self-unloading steamer. At right, the S.S. "Fred M. Green" loading rip rap

The plan of reconstruction in itself is interesting. Work has been done from both ends, beginning with the dock and loading equipment, which was practically completed during the winters 1928-29-30.



Cars dumping rock into crusher. The siren which sounds the alarm when the surge tank is full can be seen at the left on the bridge

The stone from the Sturgeon Bay plant is all shipped by boats, chiefly in those of the self-unloading type, to Detroit, Mich., Chicago, Ill., Milwaukee, Wis., and other Great Lakes points. The plant is served by no railroad, but on the other hand is admirably situated to serve the lake vessels which carry its products. The Sturgeon Bay Co. produces, besides a large variety of sized crushed stone for concrete aggregate and general construction purposes, large stone for rip-rap or breakwater purposes.

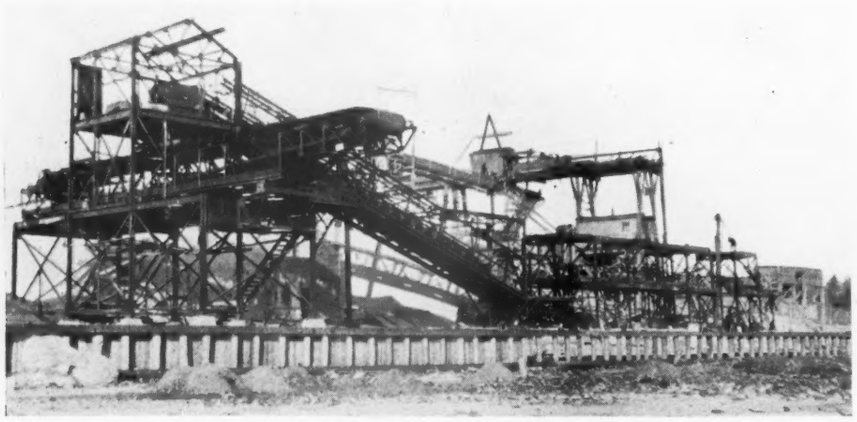
Electric Power

The Wisconsin Public Service Co. furnishes current by a 16,000-volt transmission line from a new sub-station across the bay by means of submarine cables.

A new sub-station at the plant was constructed which consists of a battery of four 4000-volt transformers supplying current to the synchronous motor generator on the electric shovel. It is interesting to know that this synchronous motor with the added efficiency in the crushing plant raised the power factor from a previous figure of 38 to 87, and with added improvements contemplated a still higher factor is expected. Eight 440-volt transformers supply the mill with power and the various motors are controlled through an Allis-Chalmers switchboard.

The conveyors are all driven by electric motors direct connected to Jones gear reduction units, eliminating noise and the worries attendant upon the use of open gears or belt drives. The lower sides of the belt conveyors are cleaned by a rotary brush driven from the head pulley shaft. Wide galleries, steps and walkways are provided where necessary, and are built of structural steel with the floors built of pre-cast concrete slabs supplied by the Federal Cement Tile Co. The pre-cast slabs were easily laid during the winter months, a scheme that speeded up construction and avoided the inconvenience of having to pour concrete in place under the severe weather conditions prevailing at that time. The window frames and sash are all of steel and the entire crushing plant is enclosed in Armco corrugated iron.

The new plant of Dolomite, Inc., at Sturgeon Bay, Wis.



A view of the plant from the dock

The Quarry

The town of Sturgeon Bay, Wis., is roughly 200 miles due north of Chicago, Ill., and is located on the narrow strip of water that separates Green Bay from Lake Michigan. The plant of the Sturgeon Bay Co. is situated on a picturesque bluff four miles north of town and overlooks a natural inland harbor.

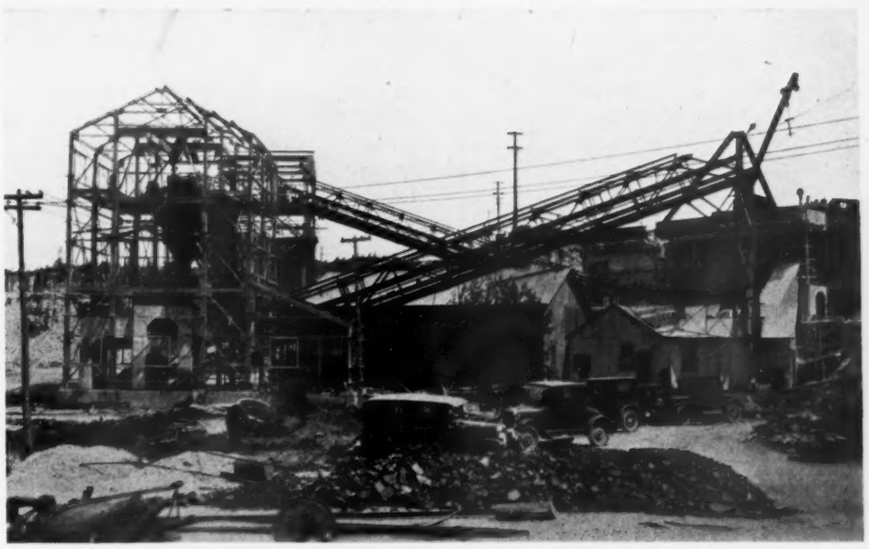
Quarry operations had been previously started on a lower bench with a 50-ft. face, but at present only the upper ledge with a 47-ft. face is being worked. Later, when larger tonnages are required, this lower bench will also be worked.

The method of stripping is novel and interesting. The overburden is loaded into a

Haulage system for conveying rock to the crusher

This is the swinging arm that operates the electric siren when surge bin is full

"digester" which reclaims such broken rock as there is in the overburden, and hydraulically conveys the earth to the shore line of the property, sufficiently removed to be permanently out of the way. The "digester" is shown in one of the accompanying views. It is mounted on a standard caterpillar truck and is movable along the earth bank, merely by changing the connections from time to time with the main pipe line used for conveying the waste material away. A small shovel loads into the bottom of a hopper, where there is a Stephens-Adamson live-roll grizzly. An 8-in. stream of water is turned into this hopper with the earth to help separate the clay and rock. More water is introduced underneath the grizzly. A Bucyrus-Erie gas-air ¾-yd. shovel is used for loading the stripping, which is overcast after the operating season by the larger quarry shovel.



View taken during the construction of the secondary crushing building

The digester which reclaims rock from overburden

A closeup view of the siren

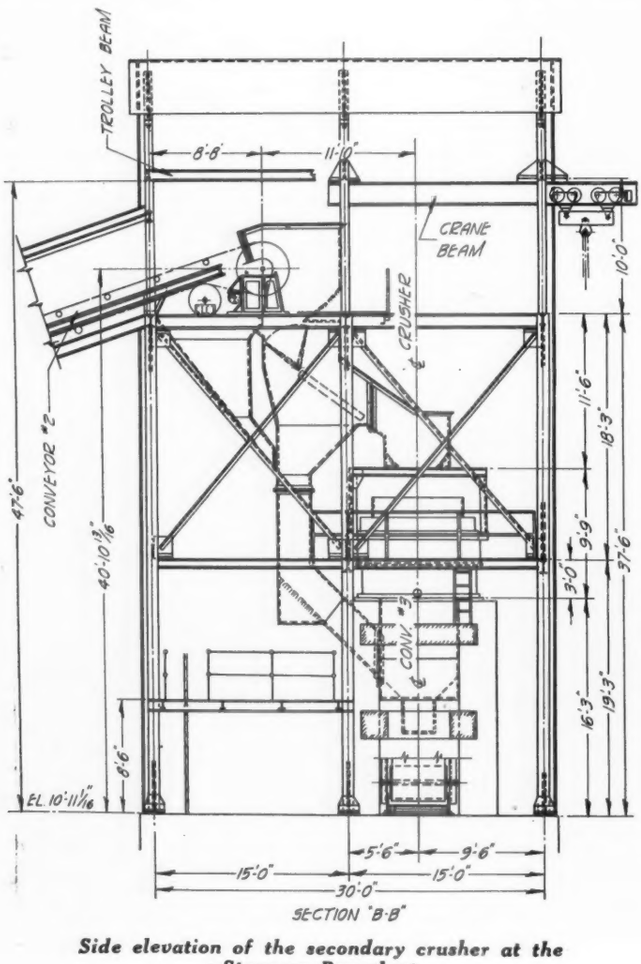
Primary drilling is done by one Cyclone and five Loomis electric operated well drills size 44-E-2. The holes are drilled 12-ft. centers and with from 14- to 16-ft. burden, are loaded with 4x16-in. 40% quarry gelatin and electrically exploded.

The drilling rate will average 45 ft. of hole per 10-hour day. The deposit is a dolomitic limestone, highly stratified, the layers being from a few inches in thickness up to 30 in., with some earthy material at the intersection of the bedding planes. Primary shooting breaks the rock into remarkably small pieces and these comparatively small rectangular pieces lie thoroughly shattered, but still not scattered, one layer of broken stone above the other, and resemble in a way the appearance of a loose brick structure. Very little secondary shooting is necessary, as the larger pieces of stone, from the thicker layer, are pushed to one side by the 120B Bucyrus shovel and are later loaded by an older steam shovel, by means of a chain sling, and shipped for rip-rap material.

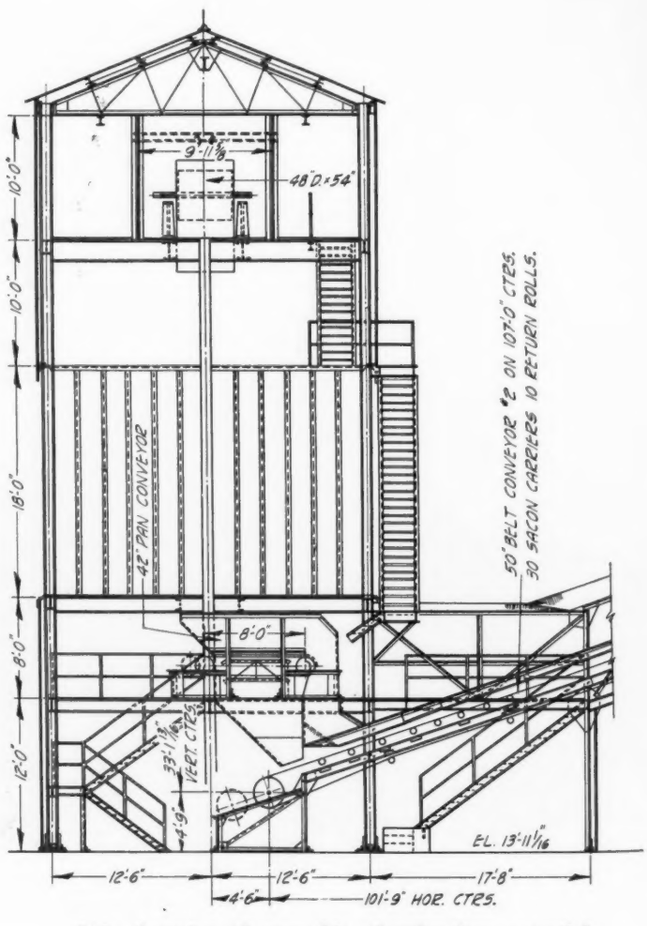
The upper ledge is an almost straight face 1800 ft. long, and the distance from the crusher to this face is about 500 ft. The quarry face is parallel to the shore line and also parallel to the long axis of the plant.

Shooting is done behind the Bucyrus electric shovel as it advances across the face, the north half being shot down while loading at the south half, and vice versa. Haulage for each half of the face is done over a double loop that eliminates any delays during shooting or track moving. The haulage system consists of four trains of 5-yd. Western dump cars with two Whitcomb, Plymouth and an American steam locomotive, which convey the rock over the level quarry

A view of the surge tank, capacity, 600 tons



Side elevation of the secondary crusher at the Sturgeon Bay plant



Side elevation of surge bin, showing how material is fed to off-bearing conveyor

floor and dump direct into the 42-in. Allis-Chalmers gyratory crusher used as a primary breaker.

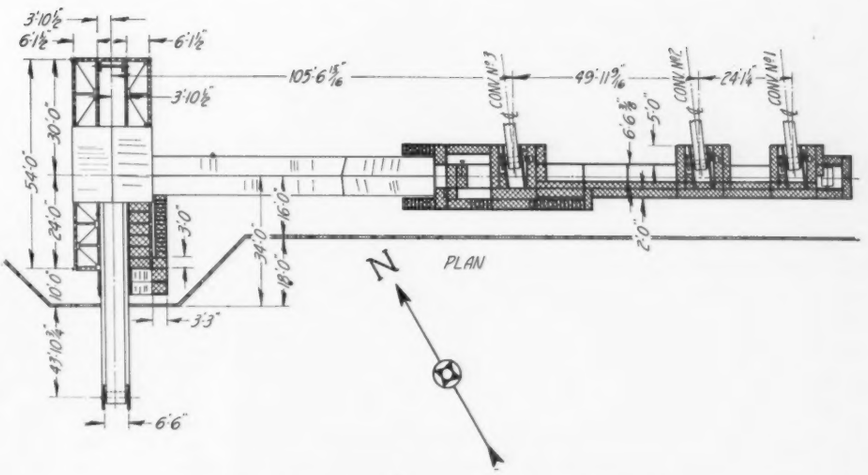
Crushing Plant

The primary crusher discharges a 6-in. product to a 50-in. inclined belt conveyor that serves the surge bin. This belt passes over a Merrick "Weightometer," so that daily quarry production tonnages can be quickly obtained and a check on the efficiency had at all times. This is the first of several production tonnage recording devices with which the plant is equipped, each giving the management a check on quarry, plant and loading tonnages. These devices will be referred to in their proper sequence.

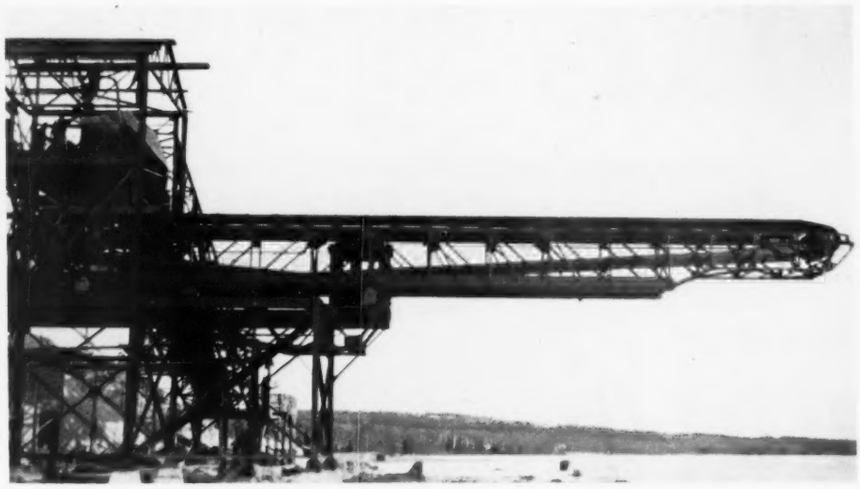
The Surge Bin

Undoubtedly the outstanding feature of the entire new installation in connection with the crushing plant is the use of a surge bin between the primary and secondary crushers. This bin after two years of use has proven a valuable feature and has permitted continuous operation of the secondary crushing and screening plant during temporary delays at the primary crusher or in the quarry. Besides this advantage it permits a regulated and uniform flow of stone through the screening and washing plant, thus greatly promoting the efficiency of all the mill machinery. So far as we have any record, this is the first installation of its kind, and certainly first in its completeness.

The surge tank, built of steel and reinforced concrete, has a capacity of 600 tons and discharges direct to a Stephens-Adamson pan conveyor that regulates the flow of material from that bin. This pan conveyor has a speed range of from two to six revolutions per minute of the head shaft and is driven through J.F.S., variable-speed transmission and a Jones gear reducer. Owing to the large size of this bin and the method of controlling its discharge, rock can be delivered to the 50-in. belt that serves the 7-ft. Symons cone secondary crusher at any predetermined rate, and during times when the equipment ahead of the bin is down for minor repairs.



Plan of conveyor system used on the dock



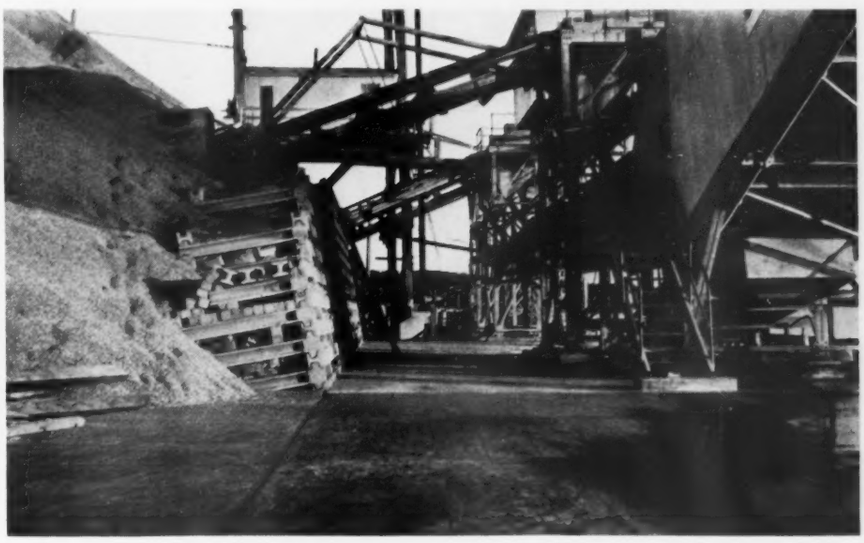
Shuttle conveyor used for loading vessels at dock

Control Devices

The surge bin is provided with an electrical siren that gives an alarm when the bin is full. This siren is connected by suitable wire and cord electrical device, to a vertical, swinging arm that hangs a few feet off from what would normally be the center or apex of the rock cone in the bin. When the crushed rock cone is of sufficient height it exerts a side thrust on the vertical member and pushes it away from center, resulting in the necessary contact to sound the siren.

The pan conveyor is also provided with a set of interesting recording instruments. This device was supplied by the Warren Telechron Co. of Ashland, Mass.

The development of the Telechron motor by that company has made possible the utilization of ordinary lighting current for synchronizing highly accurate timekeeping instruments required in recording meters and in industrial time-recording systems for a wide range of uses. The small self-starting, single-phase, synchronous motor operates in conjunction with two dial recording instruments; one records the actual time that the pan conveyor operates and the other records the actual time not operating, and it also



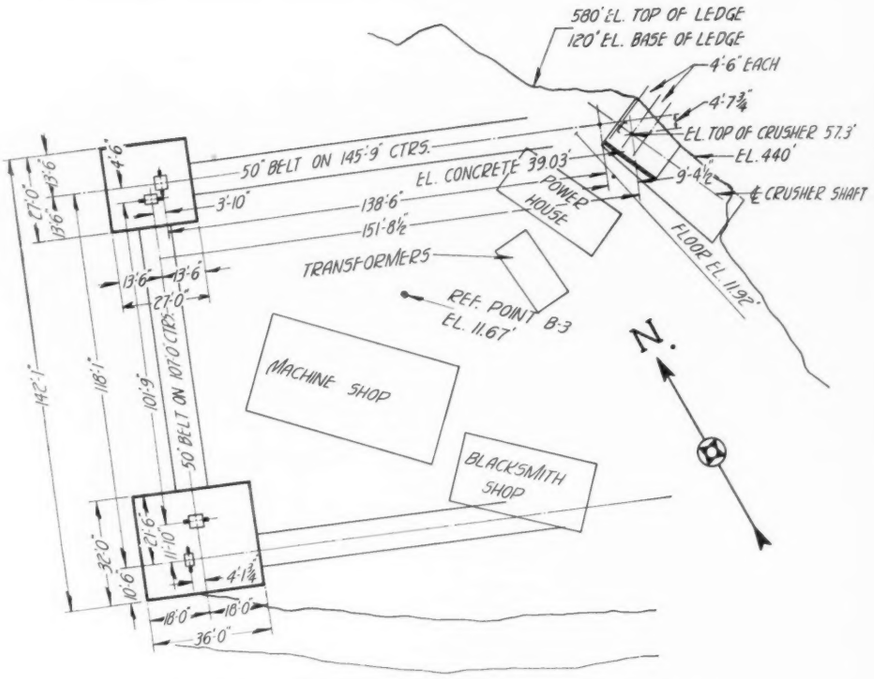
Conveyors which serve gathering belt from stock pile

functions to automatically start the conveyor. To explain more fully, if the surge bin should become empty or the power go off, this instrument will not only record the fact but will throw the necessary switch every minute, and when conditions are normal again will continue the regular production. The pan conveyor is also equipped with a Productometer supplied by the Durant Manufacturing Co., of Milwaukee, that records the revolutions of the head pulley of this unit so that a further check on daily production is obtained.

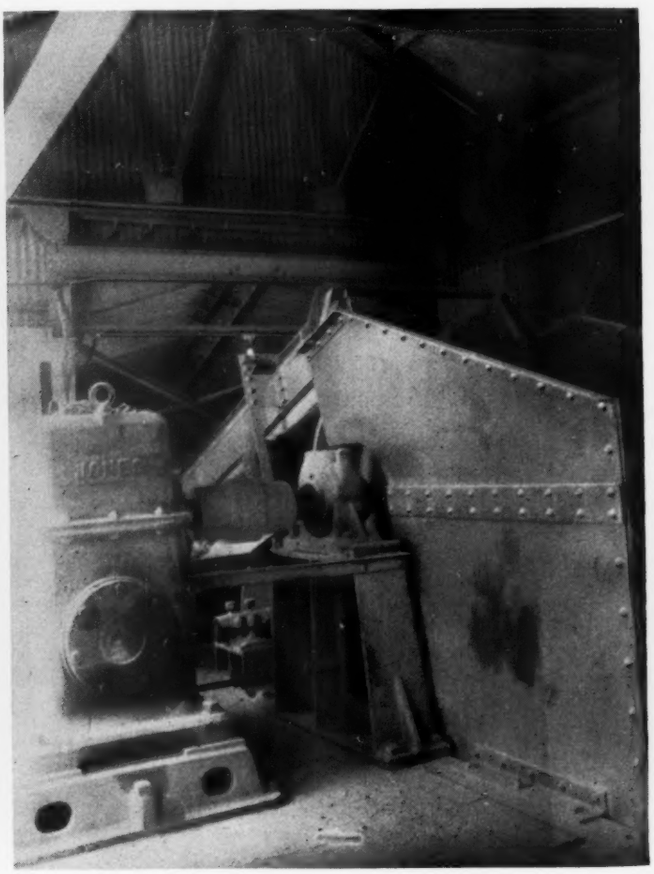
The Symons cone (secondary) crusher can be regulated to give an evenly balanced size of the required product, and the rock after passing through this unit is conveyed by a third 50-in. belt conveyor to two Stephens-Adamson vibrating screens; the oversize passing to gyratory crushers for recrushing before entering the screening plant with the balance of the material.

Another rather unusual feature of the 50-in. belt conveyor installation is: Above and alongside each of the belts is a 10-in. channel, so fastened to the conveyor frame that it supplies additional rigidity to the conveyor roller supports, tending to prevent the conveyor belt from drifting out of line and also acting as a guide board that prevents side spillage from the belt.

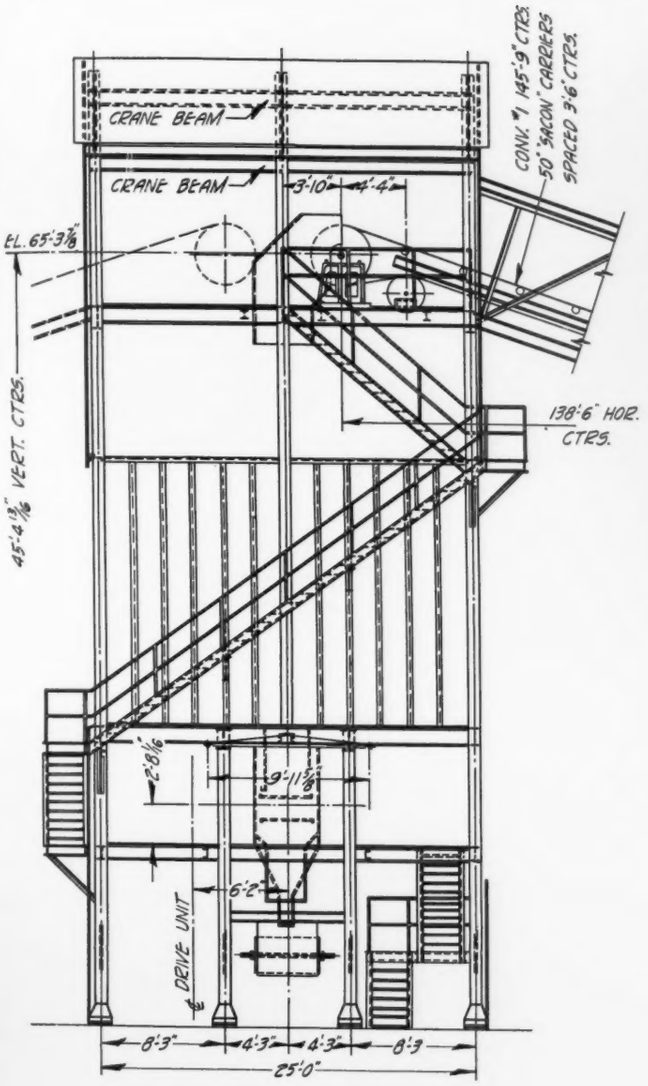
Up to this point the plant as described is new except for the primary crusher and quarry transportation equipment, which merge into that remaining of the older operation, as described in Rock Products, June 2, 1923. Briefly stated, the older parts of the installation serve to perform addi-



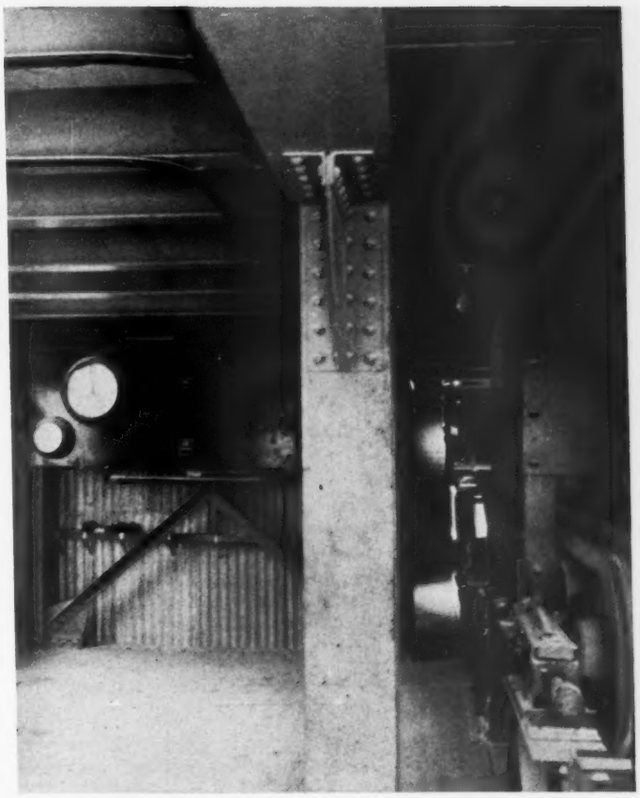
Key plan of the Sturgeon Bay operation, Dolomite, Inc.



At the left is shown the head pulley and gear reduction on conveyor from the primary crusher to the surge bin. Note channel iron sides to conveyor which serve as splash boards as well as give rigidity. At right, the discharge end of the belt conveyor over the crusher

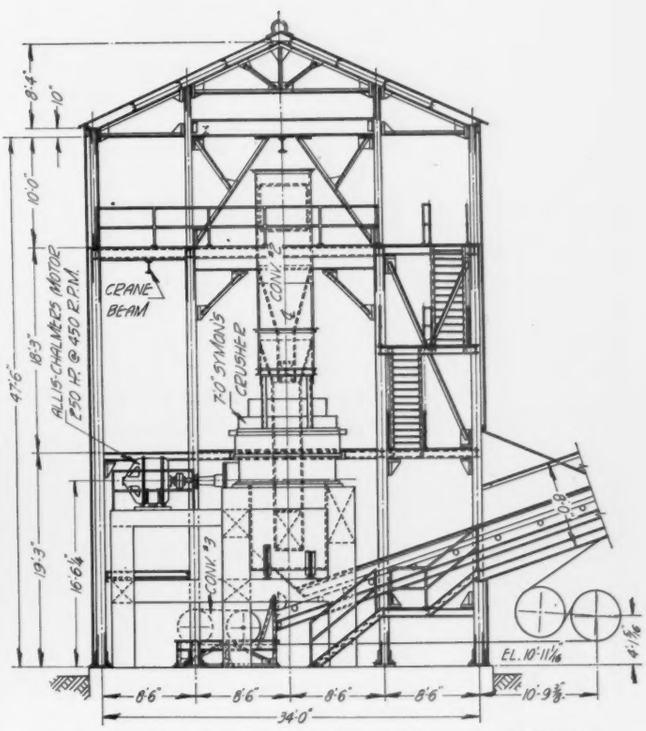


Cross section view of the surge tank

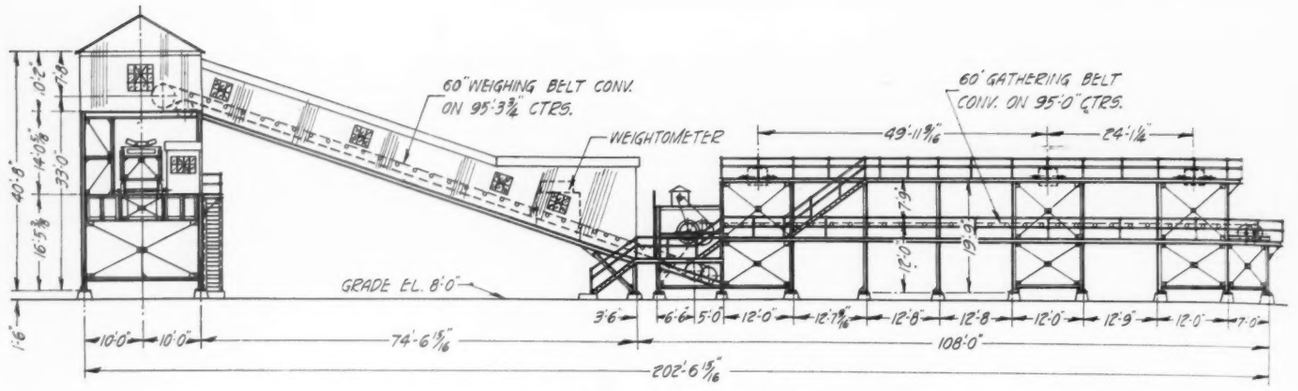


At left are the dials of the electrical system which automatically starts and stops the pan conveyor, at right, as well as recording actual time conveyor operates or does not operate

General view of the 1000-ft. dock and conveying equipment



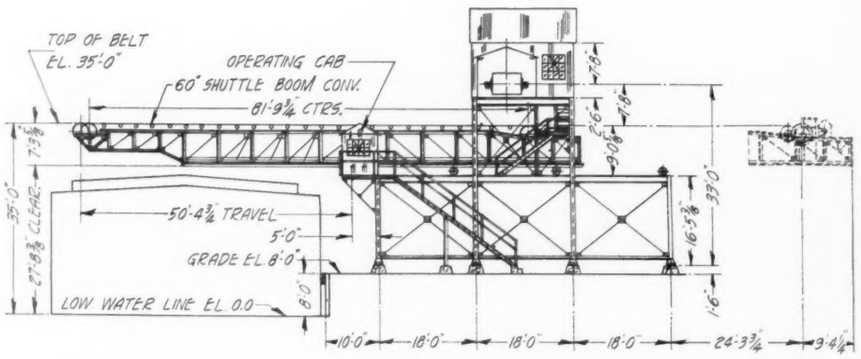
Side elevation showing crusher details and off-bearing conveyor in secondary crusher building



Cross section view of the dock conveying equipment

tional screening and to distribute the various sizes of crushed stone to stockpiles over belt conveyor tunnels. The belt conveyors operating in these tunnels, which are perpendicular to the dock face, previously discharged through chutes into the vessels. This method was found to be inadequate to serve properly either the boats or the plant; and since much of the old loading installation was of a temporary nature, it and all the loading equipment have been replaced.

In the new loading plant there are three reclaiming tunnels each having a 40-in. belt that operates at 550 ft. per minute. These three belts discharge to a 60-in. "gathering" belt that parallels the loading dock. The gathering belt discharges to an inclined belt on the same center line serving a shuttle belt, which is mounted at sufficient height to clear the largest boat's superstructure. Near the foot of this belt another Merrick Weightometer has been installed so that the tonnage of rock being loaded can be determined.



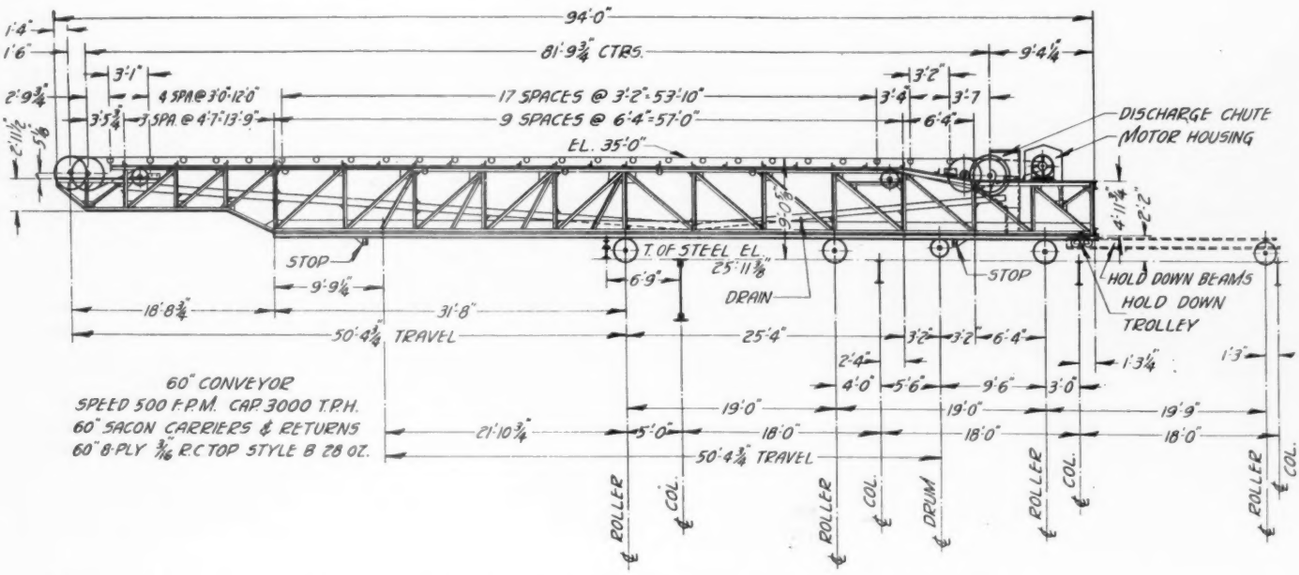
The shuttle boom conveyor, showing location of operator's cab and conveyor head housing and of supporting structure side elevation

Ship-Loading Equipment

The shuttle belt conveyor was completely assembled by the Stephens-Adamson Manufacturing Co. before being shipped to the plant.

The shuttle belt has a center to center length of 81 ft. 9¾ in. and also is provided with a Goodyear rubber belt, 60-in. wide. This size of belt is unusual and at the operating speed of 500 ft. per min. can load the boats at 3000 tons per hour. The shuttle belt and the others also are provided with Sacon carrier and return rolls. The belt is 8-ply and has a 3/16-in. rubber top wearing surface. The entire shuttle runs on wheels that are mounted rigidly on the supporting structure so as to enable it to be moved out over the cargo boats.

The loading belts are all driven through Jones spur-geared reduction units and are Alemite lubricated.



Side view of the shuttle conveyor boom used for loading lake boats

The dock itself is roughly 100 ft. long and is constructed of a series of tie piles and sheet piling and after filling from the shore line to piling with rocks, the piles were capped with concrete. There is maintained a depth of 22 ft. of water in front of the wharf at all times.

The boom of the shuttle conveyor was assembled and shipped to the Sturgeon Bay plant as shown

Most of the foregoing construction work was done during the severe winters of northern Wisconsin, where 40 deg. below zero and deep snows are no novelty. In transporting the assembled shuttle conveyor from the railroad to the plant two specially designed sleds were used that were pulled over the snow to the plant four miles away by five trucks. The shuttle was shipped to the plant on two flat cars but only after the company had secured special permission from the railroad to ship. A flexible support was built in the middle of each car that permitted the cars to pivot at the curves and cables anchored the load against wind and side sways.

The shuttle belt was set in place by using the 120-B Bucyrus quarry shovel Considerable ingenuity was exercised by the plant officials in transporting the shuttle boom, as can be seen in the picture.

With the shuttle boom's facility for moving in and out the head of the conveyor is always centered over the boat's hatchway and delivery of material to the boats thereby speedily accomplished.

Rock for rip-rap or breakwater construction purposes is hauled to the water's edge on a flat-bottomed truck, where the large stone is loaded to the boat by a Whirley shore crane and the ship's gear.

The new portion of the plant was designed by W. W. Patnoe, chief engineer of Dol-

Some interesting pictures taken during the moving of a crusher and shovel from the railroad yards to the plant, four miles away. Heavy snow drifts and a temperature of 40 deg. below zero made this a he man's job

As can be seen, it was necessary to run a snow plow ahead to clear the road and use two tractors in tandem formation for motive power. The special platform trailer facilitated loading and unloading and it delivered the goods

omite, Inc., and the Sturgeon Bay Co., and erected by the company under Mr. Patnoe's supervision. The Stephens-Adamson Manufacturing Co. furnished the conveying machinery, conveyors and belts. N. E. Hanson is superintendent.

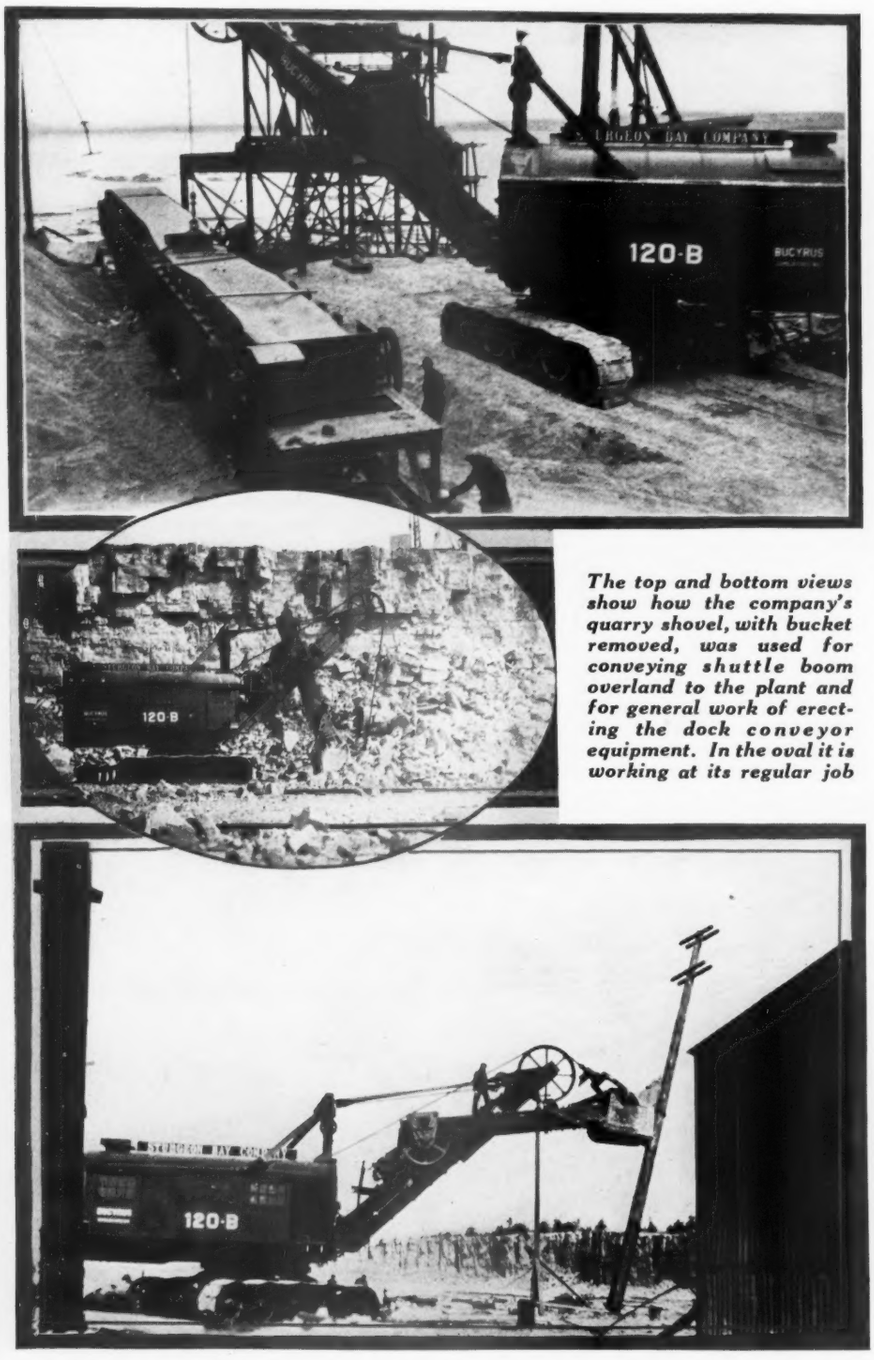
Canadian Asbestos Exports During February

EXPORTS of asbestos from Canada during February of this year totaled 7,120 tons, valued at $457,152 against 9,448 tons, valued at $656,223 in February, 1929, and 6,658 tons, valued at $463,341 in January of this year. Asbestos Corp. ships out most of Canada's asbestos exports.

Holston Quarry Company Buys Watauga Quarry

ONE HUNDRED ACRES of rock, once sold for a white mule, purchased many years ago by General J. T. Wilder, pioneer developer of the Appalachian section, now owned by Jno. R. Dickey, Jr., of Bristol, Tenn., has been leased, for fifty years, to the Holston Quarry Co., of Knoxville, Tenn.

The property is located at Watauga, on the Southern Railway, and was purchased about fifteen years ago from Miss Mary Wilder, daughter of General J. T. Wilder, by Jno. R. Dickey, Jr., and Walter Grindstaff, of Elizabethton, who later sold his interest to Mr. Dickey, and has been operated as a quarry for forty years, the last ten years by Jno. R. Dickey, Jr.



The top and bottom views show how the company's quarry shovel, with bucket removed, was used for conveying shuttle boom overland to the plant and for general work of erecting the dock conveyor equipment. In the oval it is working at its regular job

Holston Quarry Co. is a million dollar organization, owned by Knoxville people, the officers being Thomas McCroskey, president; Robert S. Campbell, vice-president; Charles M. Seymour, secretary, and W. H. McCroskey, treasurer. Thomas McCroskey is a director of the American Zinc Co. and the active head of the American Limestone Co., owned by American Zinc Co. It is said that the American Zinc Co., through its subsidiary, American Limestone Co., will be a large stockholder in a company to be organized to operate the Watauga quarry under the lease of Holston Quarry Co.

The Watauga quarry has been operated by Mr. Dickey for the past ten years, the output being limited to ten cars per day. The Holston Quarry Co. now has about fifty men engaged, under the supervision of R. S. Campbell, vice-president; Roy Reddie, engineer, and J. M. Pirkpey, superintendent, in building a plant, at a cost of more than $100,000, with a capacity of forty cars of crushed stone per day, which may be increased to sixty cars per day by operating a night shift.

The quarry plant will be equipped with the latest model machinery to produce crushed stone for road and all building construction in which concrete is used. Stone for chemical and manufacturing processes will also be produced.

While the lease is limited to fifty years, and the royalty to be paid is five cents per ton, it is said that the rock will probably not be exhausted for hundreds of years. It is said that geologists estimate the depth of the rock to be seven thousand feet.

In the leasing the property, Mr. Dickey retained about five acres on which he has a modern lime plant of small capacity. A part of the lime requirements of the Columbian Paper Co. of Bristol, and of the Meade Fibre Co. and Eastman Kodak Co. of Kingsport, are supplied from this plant. It is reported that Mr. Dickey contemplates greatly enlarging the lime plant at once.

The Holston Quarry Co. expects to have the new plant ready for operation about July 1, and will be in a position to furnish crushed stone for the many highway and building projects under way in East Tennessee.—*Bristol* (Tenn.) *Herald-Courier.*

D. W. Yambert Joins Engineering Concern

D. W. YAMBERT has joined the Fairfield Engineering Co., Marion, Ohio, as mechanical and electrical engineer. Mr. Yambert has had very broad experience in stone and slag handling problems. He was previously connected in a similar capacity with the France Stone Co., Toledo, Ohio, and more recently with the Marion Steam Shovel Co., Marion, Ohio.

Experience With Slurry Filters at the Osborn, Ohio, Plant of the Southwestern Portland Cement Co.

An Installation in Keeping with the Rest of This Modern Plant, and One Offering an Ideal Opportunity for Comparison of Slurry Feed With and Without Filters

By Earl C. Harsh
Associate Editor, Rock Products

THE SLURRY FILTERS which the Southwestern Portland Cement Co. installed last August at its Osborn, Ohio, plant have now been in operation some months and show quite interesting and satisfactory results. This initial installation to handle the feed to one kiln of this four kiln plant was furnished by the Oliver United Filters, Inc., and is what is known as the American continuous type.

Filtering the slurry in this way and thus removing a large part of the water in the kiln feed has resulted in a decided increase in kiln capacity, along with a decided decrease in coal consumption per barrel of clinker burned, and a very material increase in the amount of steam generated in the waste-heat boiler. It has also done away with the formation of mud rings in the feed end of the kiln, and has had a tendency to form smaller clinkers in the kiln, making for more uniform and thorough burning. The additional steam available from the waste-heat boiler by reason of the higher temperatures of the waste gases is several times that required to generate the electric power necessary to operate the filter and its auxiliary equipment.

The installation consisted of two separate filter units of nine discs each, and was based on a somewhat different slurry mix than is now being used. At the present time only one unit of nine discs is being used, since it was found to have sufficient capacity with the present more easily filterable mix.

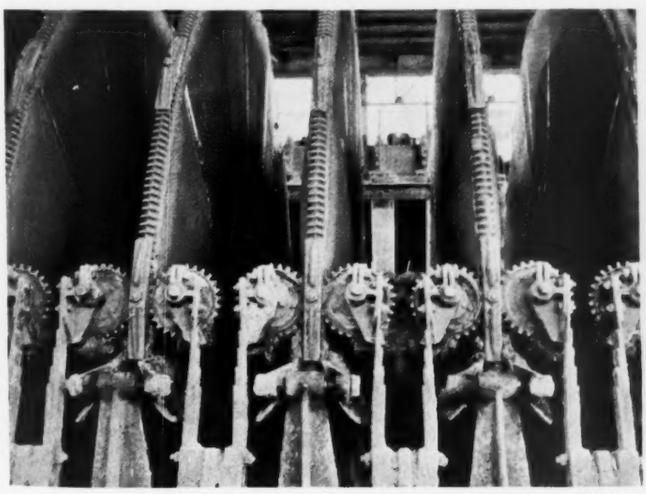
Each disc has a filter area on the two surfaces of 200 sq. ft. so that the one unit has a total filter area of 1800 sq. ft. The discs are 12 ft. in diameter and each disc is made up of 15 sectors. Each sector consists of a separate bag over a supporting frame, so that there is a total of 135 bags on the unit, each with a filtering area of 13⅓ sq. ft.

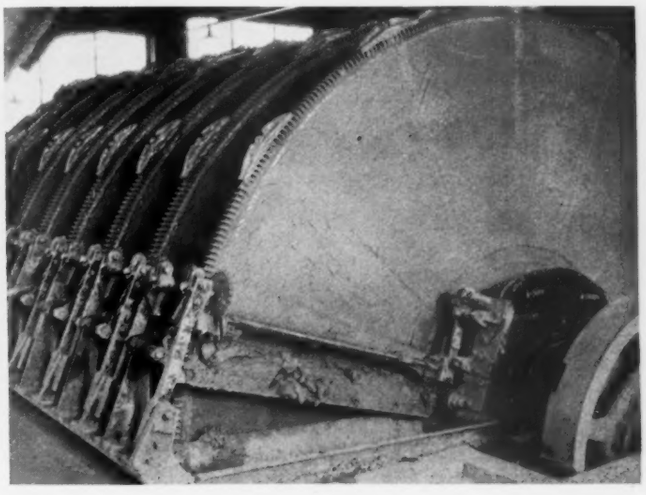
Various kinds of filter cloth material for bags were tried out, but what is known as 15 oz. Palm twill has given the best results, and is being used at present. For some reason not yet definitely determined the slurry at this plant has a tendency to rot the bags and limit their useful life to about 25 days, but it has been found that a simple and inexpensive treatment of the bags prolongs their life to about 40 days.

The filtering operation is continuous, but in three stages. The lower part of each disc is submerged in an individual slurry tank kept filled to a certain level, and as the disc slowly revolves the filter cloths pick up a certain thickness of the slurry, depending upon the speed at which the disc is revolved and the amount of vacuum maintained on the inside of the bags.

Considering any one sector of the disc, after it emerges from the slurry tank, and as it travels slowly up and over to the removal or discharge point, the vacuum acts to draw the water out of the slurry through the filter cloth, thus drying it. On the descending side of the revolution as it approaches the discharge point, the suction is cut off from the inside of the bag and a very slight air pressure substituted, which bulges the cloth out slightly and assists a set of corrugated rollers bearing against the cloth and turning with it at the same speed, to break off the filter cake, which then falls through hoppers between the discs on to a belt conveyor below. Thus during each revolution of the discs there are three stages in the complete cycle; first, the pick up, which is about 40% of the cycle; second, the filtering or drying, which is about 40% of the cycle, and third, the discharge, which is about 20% of the cycle.

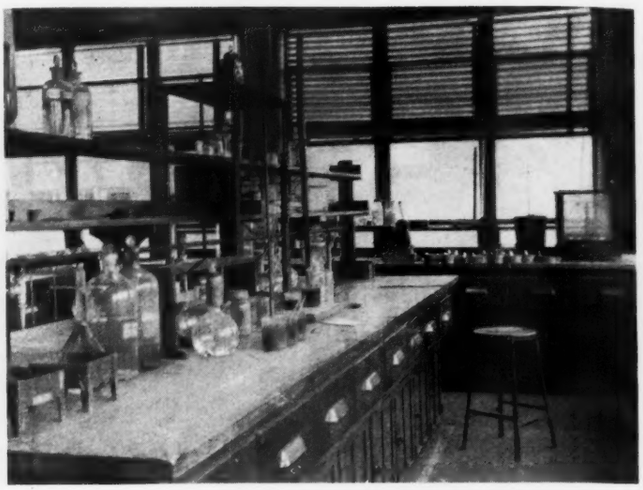
Each of the 15 sectors on each disc is arranged with a connection from the inside of the bag and supporting frame, through the large hollow central shaft supporting the discs, to valves controlling the vacuum and air pressure, which are automatically opened



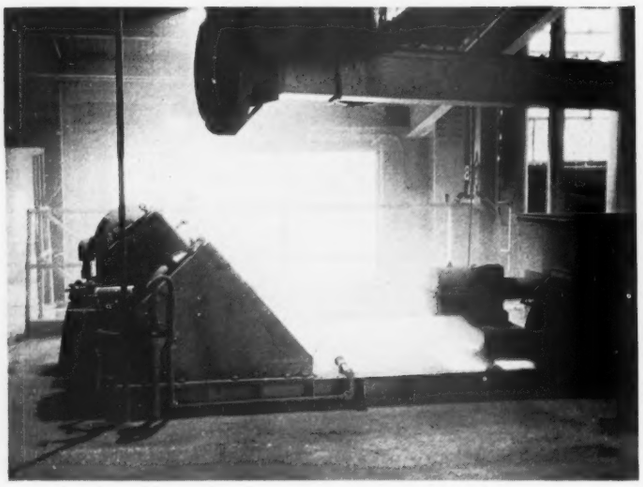


Two views of discharge side of filters showing rollers and scrapers

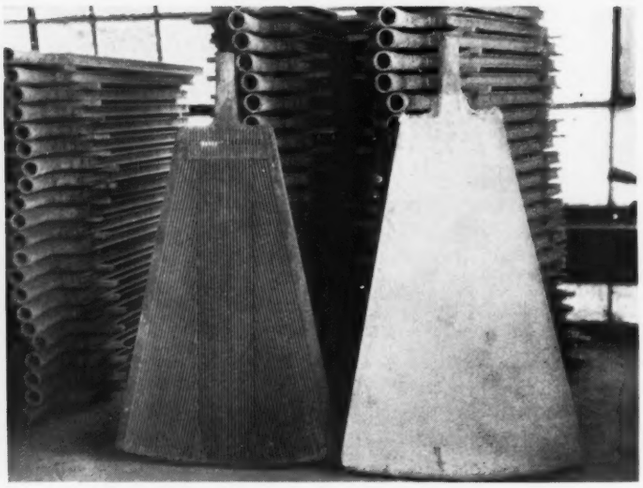
One end of the physical testing laboratory



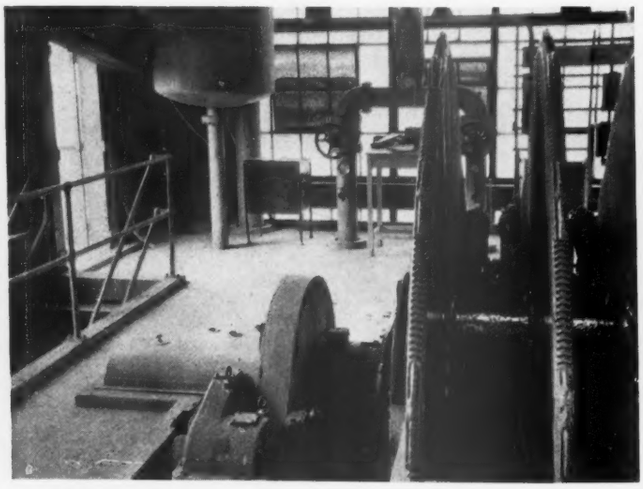
A corner of the chemical laboratory



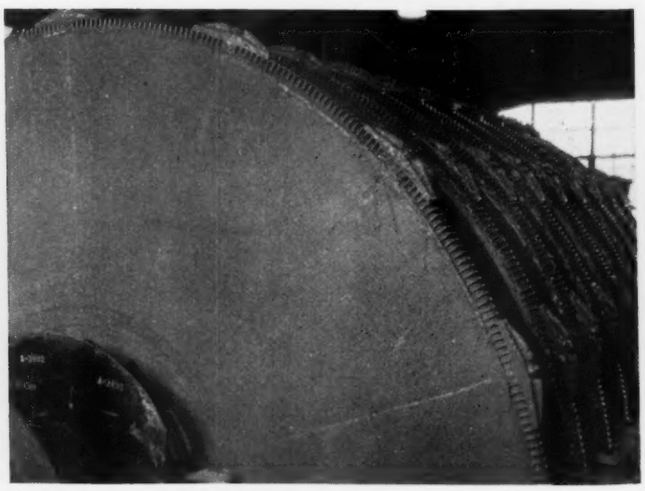
This view shows the kiln feeders and spout with pug mill at the right, where the dry fine material from the dust-collecting system is fed in and mixed with the cake, and thus put back into the kiln



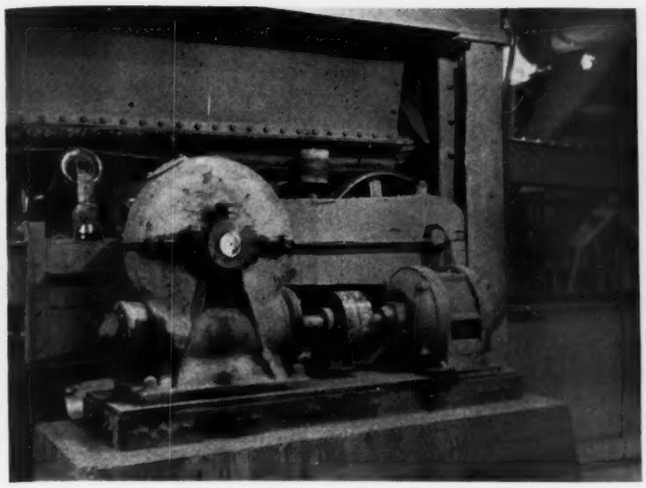
Individual sectors showing frame work, design and covering. Conveying an idea also of the large hollow central shaft for supporting the discs as well as transmitting the vacuum and compressed air as needed



Driving end of the filter unit, which is driven by a 3-hp. direct-current, variable-speed motor through a special speed reducer designed especially for this job



End view of drying section of filter disc, indicating sizes of various sectors and how they are held in place with rods and clamps, permitting ready removal and replacement



Left shows 30-in. conveyor and drive under the filter, and at right, conveyor discharging cake to the pug mill

and closed at the proper points as the discs revolve.

A vacuum of about 28-in. is used on the pickup and drying stages, and the slight air pressure during the removal stage is furnished by a compressed-air jet.

The vacuum is maintained by a duplex, single-stage, Ingersoll-Rand vacuum pump, driven by a direct-connected 150-hp. synchronous motor. This motor is considerably larger than required to operate the pump at 28-in. vacuum, but is necessary because of being the synchronous type and because of the characteristics of a vacuum pump, which requires more power in starting and bringing up past the 18-in. vacuum point than when operating at 28-in. vacuum. In other words, a motor of about one-half this size would be sufficient, if it were not for the starting characteristics of the synchronous type motor and the vacuum pump. However, this over-motoring does no harm, but on the contrary is used to obtain the benefit of an improved power factor in the plant as a whole.

The vacuum pump is connected to the filter through a trap or separator which removes all moisture through a down pipe leading to the lower floor and with a water seal at the bottom. The water which is extracted from the slurry drains to a pump below and is pumped out to a reservoir by a small centrifugal pump with automatic float control.

The filter itself is driven by a 3-hp. Allis-Chalmers, direct-current, variable-speed motor through a special speed reducer designed by the filter company to meet the conditions at this plant.

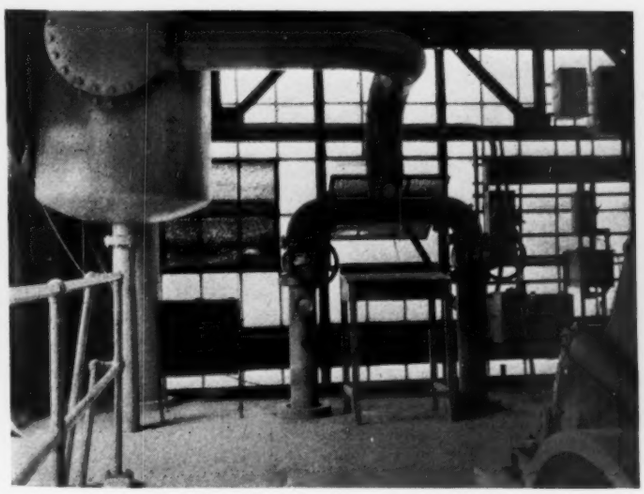
It is a double reducer using both herringbone gears, and worm gears, with a break pin for protection. These reducers are built to meet any condition and to suit the speed at which the filter is to be operated.

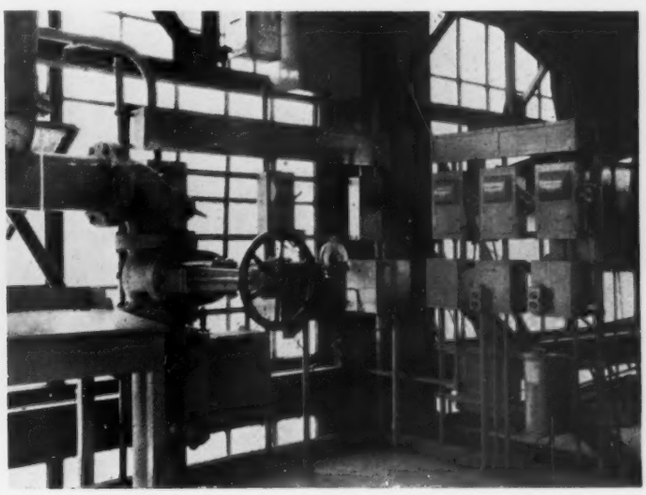
The filter discs at this plant are run at a speed of one revolution in approximately seven minutes, this speed being varied slightly to give the desired feed to the kiln. The filter cake, which is ⅜ in. thick, dropping through the hoppers between the discs, falls to a slow moving belt conveyor, which discharges to a pug mill, and that in turn to the feed spout of the kiln. The belt conveyor is 30 in. wide by 40 ft. long and is driven by a 3-hp. Allis-Chalmers induction motor through a worm reducer. The pug mill is 30 in. by 12 ft. and is also driven by an individual motor through a gear reducer.

The feed spout to the kiln consists of a heavy 14-in. screw conveyor in a water-jacketed spout, and is driven through a Cleveland worm gear reducer by a 15-hp. Allis-Chalmers, slip-ring motor.

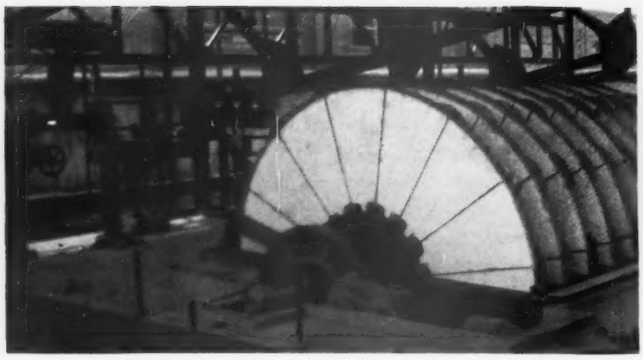
This motor is somewhat larger than necessary and is of the variable-speed type because the operating officials of the company wished to determine for themselves the best speed at which to operate this screw.

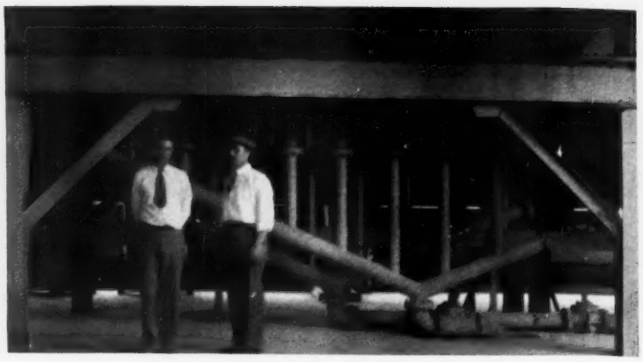
At the feed end of the pug mill the dry fine material from the dust-collecting system is fed in and mixed with the cake, and thus put back into the kiln. The use of a pug mill at this point is special and is not used in all installations. Its purpose in this case is simply to mix with the filter cake the fine dust collected from the Cottrell electrical precipitation system and put it back





Vacuum piping and separator with valves for regulating vacuum at left, and switches and controls for operating filter





Some views taken during the construction of the filter, showing, left, the upper half, and right, lower portion with drain piping. An indication of size is given by men standing in the foreground

into the kiln, but it is not essential to the filter installation, nor to the returning of the dust to the kiln.

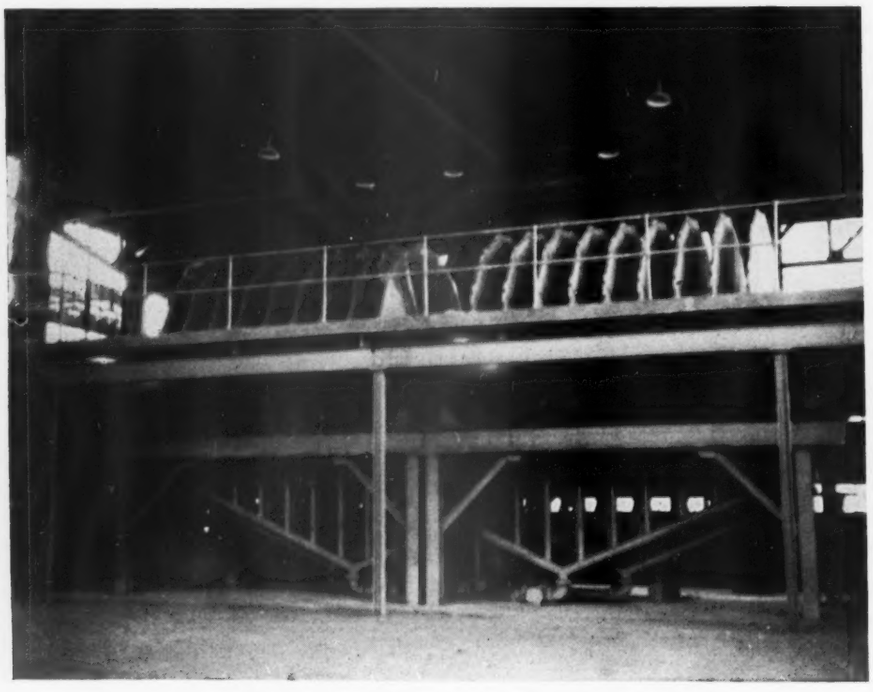
The moisture content of the slurry going to the filter is 35%, and the moisture content of the filter cake coming from the filter is 19%. The raw material in the slurry is ground to such a finenes that 92% will pass 200-mesh; 593 lb. of raw materials are required to make 1 bbl. of cement at this plant, so that 35% of water in the slurry means 912 lb. of slurry per bbl., of which 319 lb. is water. Filter cake with 19% of water means 732 lb. of filter cake per bbl., of which 139 lb. is water. So that the process of filtering has removed 180 lb. of water per bbl. of clinker from the kiln feed, or in other words has removed 56% of the water.

This plant contains four kilns, three of which were in operation at the time this article was written—one kiln was operating on filter cake feed and the other two on slurry feed, and as the three are all of the same size, 10 ft. and 11½ ft. in diameter by 175 ft. long, they offer an ideal opportunity for a comparison of the two methods of feeding.

The installation is very complete and substantial, of steel construction with concrete floors and walls and tile roof, and is in keeping with the rest of the plant. It was necessary to raise the part of the kiln building over the feed end of the kilns, which was done across the whole building, providing space for the addition of the other three units, which will probably be installed in the near future.

The most striking and pleasing feature of the filter installation, as well as of the balance of the plant is the good housekeeping and the neat and orderly manner in which the whole operation is carried on.

Two new and modern buildings have been added recently, an office building and laboratory.



General view of filters as originally installed

The Southwestern Portland Cement Co. has its main offices at 605 H. W. Hellman building, Los Angeles, Calif. Frank H. Powell is president and C. C. Merrill is vice-president in charge of operations.

The officers at the Osborn plant are W. J. Jennings, general manager; W. T. Groner, superintendent; J. E. Valzy, assistant superintendent; and J. B. Alexander, chief chemist.

Cotton Sacks Claimed to Be Preferred for Cement

WIDESPREAD PREFERENCE for cotton cement bags is indicated in preliminary results of a special survey undertaken by the Cotton-Textile Institute. More than half the reports so far received from highway engineers and heads of public works departments in cities throughout the country state that cotton bags are specified for all cement required in their building programs this year. Advantages claimed are that cloth containers are easy to handle, are cheap for extended orders, entail small loss from breakage and rough handling.

It is estimated that 250,000,000 cloth sacks are used annually by the cement industry. For replacements approximately 60,000,000 bags, equivalent to 60,000,000 sq. yd., of cotton cloth are required annually.

The Portland Cement Association estimates that more than half the cement used in the United States each year goes into construction of highways and public and commercial buildings. According to their estimates highway construction and paving account for approximately 27.5% of the annual consumption of cement in cloth bags. Building construction requires about 26%.

Under present practices the contractor who purchases cement in large quantities pays 10 cents each or 40 cents per bbl. for cotton sacks in which such shipments are made. Computing the allowance granted by the cement shipper for return of the sacks in good condition and considering that the average sack is good for at least eight trips it is estimated that larger users of cement save as much as $25 per thousand bags by specifying cotton.—*Manufacturers' Record.*

Prospecting for Potash Salts—Part I

Using Topographic Maps and Government Reports to Find By-Products of Decomposed Feldspathic Rocks

By H. N. Kirk
Keene, N. H.

FROM the decomposition of feldspathic rocks we have the near-surface products, clays and bauxite left behind as a possible guide to the leached product. Where the potash salts, much sought after today, which have leached away and disappeared, are, is a question to be answered. From what clays and bauxite that have already been mined in the United States from 1912 to 1928 (some 40,000,000 tons, more or less) allowing 5% for potash lost in leaching, would make a tonnage of over 2,000,000 tons of potash. But this 5% is based on the tonnage of clays and bauxite and not on the tonnage of original feldspathic rock, so one can readily see that if based on the rock itself, which it should correctly be, the tonnage of leached potash salts would run much higher by many millions of tons. If we were to include the estimated amount of clay and bauxite still in the deposits of the United States one can readily see that we should have a still vaster tonnage of potash salts, somewhere in settling basins, somewhere under the ground.

Land-Locked Positions Favorable Areas for Potash Exploration

Probably some of this potash salt has been carried to the ocean by the drainage systems (rivers) ages ago, but without doubt there are vast deposits held back in ancient land locked positions favorable for its retention. Just how are we to locate these deposits?

I believe that the known clay and bauxite deposits should be taken into consideration, also the present drainage system and any facts obtainable as to the topographical lay of the land ages ago. The relation of known clay and bauxite deposits of Germany should be studied in relation to the deposits of potash salts, also consideration should be given to the topographical lay of the land of the known large deposits in Germany. In one instance in Germany, for example, the white china clays of Hallee in the district of Saxony are not far removed from the Stassfurt deposits of potash salts.

The high grade Kalins deposits in England, the most important in the world, must have given up an immense tonnage of potash salts in their forming, for this clay must have been formed from almost a pure potash feldspar. Without doubt much of England's potash salts were lost in the ocean or in beds under the ocean. Here in the United States most of the known high grade clays are east of the Mississippi river in the southeast portion of the United States; also the bauxite deposits. These states include Tennessee, Kentucky, Georgia, Alabama, Arkansas, the Carolinas, Mississippi, also Illinois and Ohio.

The drilling for potash in western Texas and New Mexico was brought about by the drilling for oil wells and the finding of some potash salts caused more drilling for the direct purpose of locating, if possible, beds of potash salts of sufficient richness and thickness to be of commercial use. This drilling was, of course, justified owing to the fact that they had found some potash salts and were in hopes of finding richer deposits.

Southeastern States Should Be Investigated

But according to my theory these western Texas and New Mexico deposits have no connection with the clay beds and bauxite deposits of the southeastern states of the United States. While the United States government is justified in expecting to find deposits in western Texas of commercial value it is not justified in neglecting to seek the potash salts in the southeastern states where many millions of tons must have been released in the decomposition of feldspathic and basal feldspathic rock and have left behind the two products, clay and bauxite, which were once parts of the feldspathic rock before decomposition released them.

If one can locate the underground basin in which the leached salts found a final resting place here would be found the deposits worth the working. Careful study of the topographical maps available of the southeastern states should show some points at which a favorable location for drilling should bring results. A careful study of the present drainage system and any deduction that one could make relative to the ancient drainage system and lay of land should also be taken into consideration in choosing a location to drill.

Potash from Feldspathic Sources

Potash salts deposits from ancient sea beds could not be expected to be as concentrated as potash salts from feldspathic sources as feldspar carries from 5 to 12% potash in most of its varieties. Ocean water, it is reported, with a brine content of 3½% salt, carries only about 0.04% of potash salts.

As no large clay or bauxite deposits are reported near western Texas one is led to believe that the potash salts have other sources of origination than from feldspathic rocks.

I see no reason why one should not expect to find in the southeastern states a deposit or deposits of potash salts leached from the decomposition of feldspathic rock as before stated. The congressmen of these states should insist that a portion of the government appropriation allotted for the finding of potash salts be spent in the states above mentioned. If there are surface indications of potash salts other than the one mentioned above I do not know of them; also if drilling in any of the southeastern states has been done I have failed to see such a report.

If a potash salts deposit is found in these states, which is probable, it will be more concentrated and of greater thickness than any found in western Texas, because we have the surface indications in these states that millions of tons of potash salts have escaped from the decomposed feldspathic rock. If the government should spend $15,000,000 in prospect drilling in the next 15 years in the United States for the purpose of locating potash salt deposits it would be money well invested. The drill logs would also show up unexpected results in mineral showings other than potash salts looked for, without doubt.

A large deposit of potash salts of commercial value located here in the United States is worth more to us as a defensive measure than several battleships, and there is no reason why the United States should make such small appropriations in the search for such important chemicals. This article coming from a resident of New Hampshire to bring a possible benefit to our southeastern states cannot be construed as a plea for sectional benefit, but as a plea for a larger appropriation to carry out this search for potash salt deposits both in western Texas and the southeastern states or other sections of the country that seem advisable.

Drilling Should Be Persistent

Drilling should be persistent in western Texas and the southeastern states until results are assured. If a potash salt deposit of commercial importance were found it would be the greatest permanent farm relief

measure that the government has ever carried out. Cheap potash salts mean a low priced high grade fertilizer, which would mean bigger and better crops on less acreage at less cost and more profit. It is up to the people of the United States to demand and create such a public opinion as to stir the government officials so that they will not toy with this proposition with a few hundred thousand dollars but begin to use millions as they should. We spend millions for battleships, why not spend a few million that will not only be equal to several battleships as a defensive measure, but greatest of all will give us a cheap fertilizer, that will be a lasting benefit to our farmers; indeed the greatest permanent farm relief that the government could ever undertake. Every person in the United States would be benefited if such a potash salt deposit of commercial importance were to be found.

Government officials should not for a moment think that number one or number fifteen drill log is going to reveal a deposit of potash salts, hidden many hundreds of feet under the ground, as we have comparatively few surface indications to guide us to its location. If we were able to reveal a deposit of commercial value in fifteen drill holes it would be our good luck.

We junk battleships when they have served their purpose so we must junk drill holes if they fail to reveal the potash salts sought. I hope every farmer will write to his congressman to get busy and do something to lash into action a more intense search for these hidden potash deposits. We are fortunate at this time to have in President Hoover a man who is a practical mining engineer and who would see that all money was spent right and to the best advantage. We never before have had a man at the head of our government so fitted to carry to a successful conclusion the search for potash salts deposits.

(*To be concluded.*)

Aristocratic Yachtmen Protest Gravel Plant Operation!

LABELED as a detriment to the growth of a yachting center at the outer harbor, San Pedro, Calif., pleasure boat owners have circulated petitions urging the San Pedro Chamber of Commerce to protest the continued operation of the Griffith Co. gravel plant.

The Griffith Co. announced its intention several months ago of moving the plant beyond city limits, following the completion of work on hand at that time. It is expected that the resultant action of the Chamber will be to urge the paving company to expedite the proposed move.

The petition stated that yachtsmen are put to considerable expense in removing dust deposits from their craft, which originates at the gravel pit.—*Long Beach* (Calif.) *Press-Telegram.*

Cement and Gypsum Plasters in Wet Copper Mines

IN experimenting with various products to find some cementing material that would set under water containing copper or a mixture of free sulphuric acid and soluble sulphate such as are present in the waters of most of the mines in the Butte, Mont., district, T. E. Smith has made some interesting discoveries. These are reported in a recent issue of *Engineering and Mining Journal,* in which is also given the test and procedure details of this work.

Mr. Smith found that portland cement can be mixed with water containing copper if the acid is neutralized with carbide waste. If the liquid is poured off the sediment the results are nearly as good as though pure water were used. Plaster of paris can be mixed with strong sulphate water and will set under such water without any treatment. The high-early-strength and alumina cements, if mixed with pure water, will set hard under water of high sulphate content.

Determining Voids in Asphalt Paving Aggregate

THE COMMITTEE on voids of the Asphalt Paving Technologists has made a thorough study of the various methods of determining voids in paving aggregate and its work is given in the proceedings of the Technical Session at New Orleans, recently published.

The samples submitted to the members of the committee for voids determination were mixtures of sand and dust as follows:

	1	2	3	4	5	6
Sand.....	100%	90%	80%	70%	60%	50%
Dust.....	0%	10%	20%	30%	40%	50%

Each member was asked to find the percentage of voids by as many methods as he had at his command. The methods used and the way they are marked in the accompanying chart are:

1. Mechanical vibration in a small cylinder. This is the method developed by the U. S. Bureau of Public Roads, described in *Public Roads* for December, 1926. The time of vibration was 40 minutes and the cylinder was about 25 cc. volume. Its results are given in the chart by a full line.

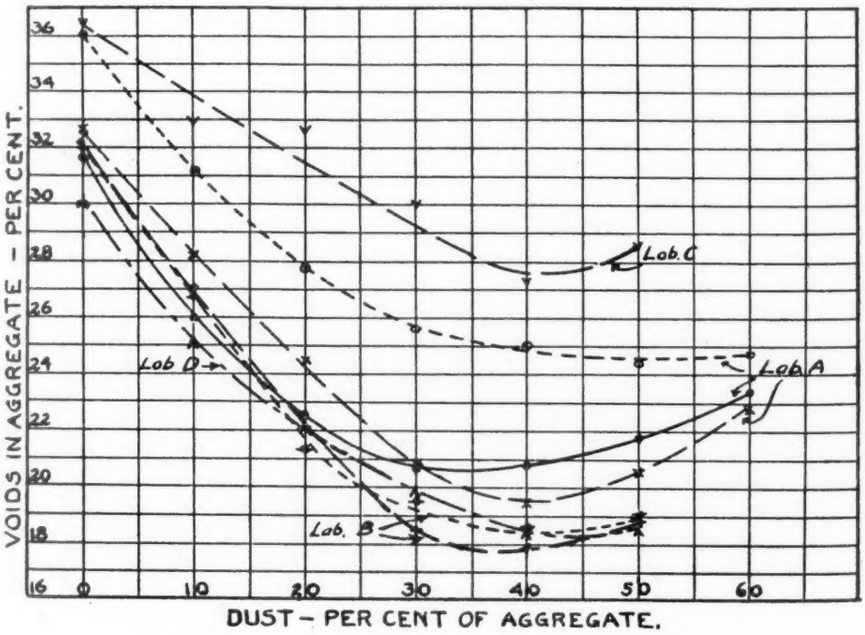
2. Hand compaction in a cylinder of the same size as above by beating on a block of soft metal for 40 minutes at 160 strokes a minute. Results in chart given as a dash line.

3. Hand compaction in a cone. The aggregate was added in four equal installments with five minutes of beating on a brass plate after each addition. Results in chart are a dotted line.

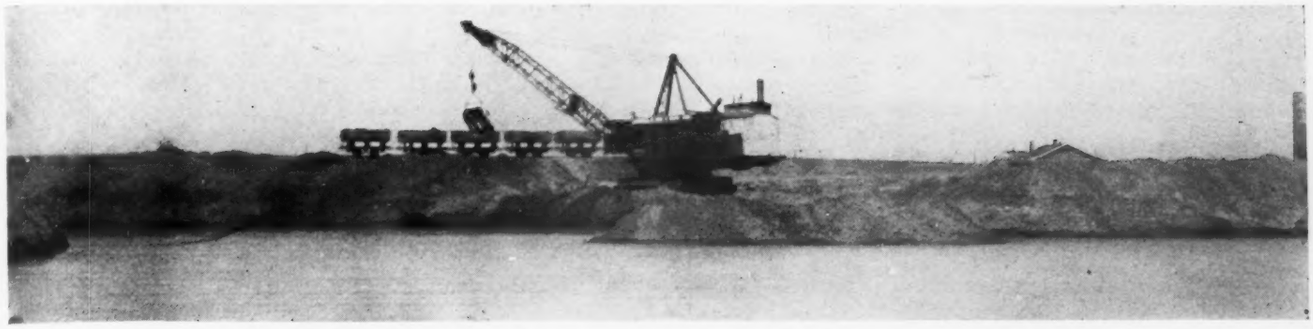
4. Hand tamping with machine compression, applied to a mixture of the aggregates with asphalt, the asphalt content varying from 7% to 9%, according to the grading. Results in chart are a dot and dash line.

The curves in the chart show a fairly good correspondence with two exceptions From notes in the report one may believe that the method of compaction used for these was not as thorough as that used for the others.

Those who have studied voids in other aggregates will be interested to note that the point of low voids is with about 35% dust, further additions of dust increasing the voids by separating the grains of sand. In a rough way this corresponds with the low voids point for mixtures of coarse aggregate and sand to mixture of fine and coarse sand grains.



Analyses of voids in asphalt paving concrete



Dragline loading at the plant of the Commonwealth Sand and Gravel Co., Richmond, Va.

Difficult Gravel Cleaning Operation Solved by Log Washers

At the Plant of the Commonwealth Sand and Gravel Co., Richmond, Va.

IN THOSE SOUTHERN STATES where the rivers are slow moving and where stream gravels have been transported great distances by these rivers, the gravel in the deposits can be said to be practically universally of small size compared to gravels from glacial sources. Not only is the material of small size but the deposits are more or less contaminated with clay or "soapstone," as it is referred to in some southern localities. This condition, coupled with the amount of overburden that has to be handled in practically every case, makes the successful and economical operation of a gravel plant there no mean engineering problem.

The deposit of the Commonwealth Sand and Gravel Co., Richmond, Va., however, contains gravel that is of such size that crushing has to be resorted to. There is about 35% sand and 65% gravel. Roughly, one-third of the total gravel is crushed, so as to pass a 1¼-in. ring. The deposit is overlaid with from 2 to 10 ft. of overburden. There is an unknown depth of gravel, for the 2-yd. Bucyrus-Erie dragline used for stripping and loading has not reached the bottom of the deposit. The overburden is at present cast back into the pit.

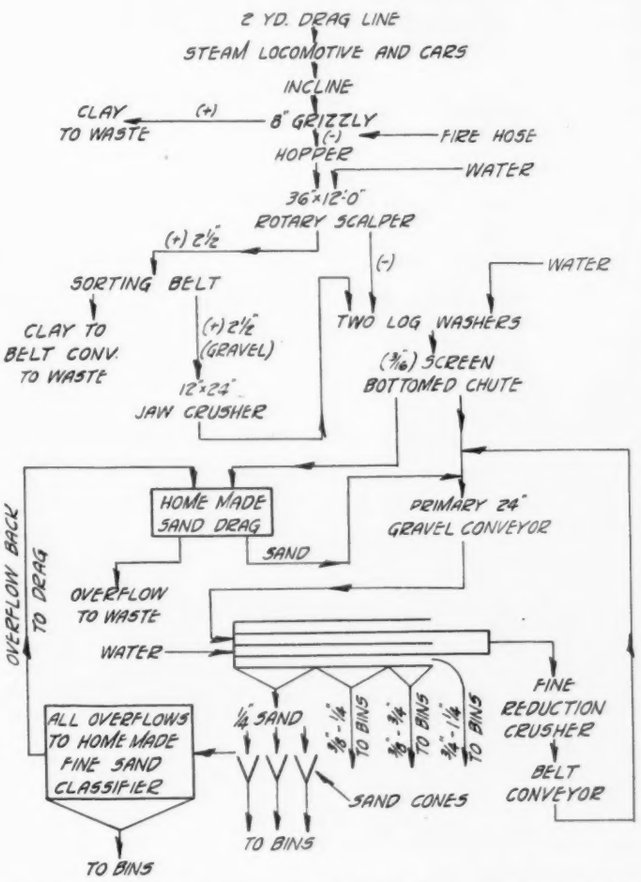
The sand and gravel deposits within trucking distance of Richmond, Va., with the exception of the operation under discussion, are predominantly sand deposits, from which only a small amount of gravel is obtained. The sand from some of these deposits, owing to their grain size and structure and clay inclusions, make excellent foundry and core sands, although the amount of clay present in the sands is so small that they are also admirably suitable for masons' sand and for general building purposes.

There are several large sand and gravel companies shipping into Richmond and these companies maintain distribution yards in that city. The productive capacity of the immediate district is confined to the smaller operations previously referred to, and the largest producer is that of the Commonwealth Sand and Gravel Co.

The Commonwealth Sand and Gravel Co. is controlled by the same interests which operate the Aberdeen Sand Co. and the Allied Sand and Gravel Co. at Norfolk, Va., the Petersburg Sand and Gravel Corp. at Petersburg, Va., and the Massaponax Sand and Gravel Co., Fredericksburg, Va., and Bowie, Md., and other operations in that vicinity.

The general offices of the Commonwealth Sand and Gravel Co. are at Norfolk, Va., with the operations of the Richmond plant directed from offices located at 2100 West Leigh street, Richmond, Va. The president of the company is John Twohy. L. G. Thom is vice-president and general manager; E. L. Doran, secretary and treasurer; H. G. Brown is plant manager.

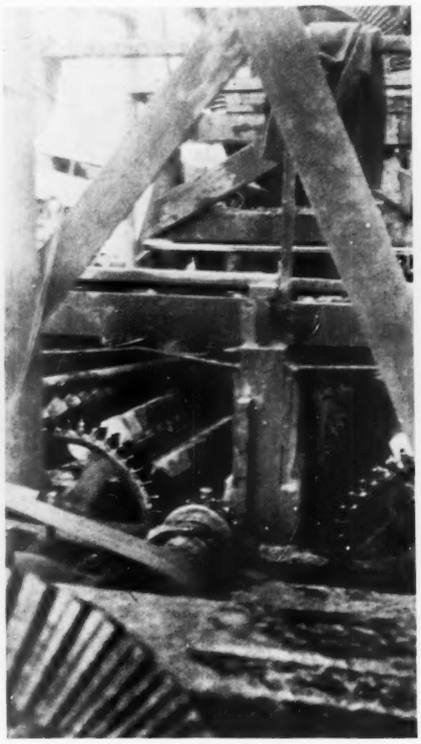
The washing plant and deposits are located at Twohy Siding, on the C. and O. railroad, one mile east of the city on the Darbytown road, with the post office address given as R. F. D. No. 6, Richmond, Va.



Flow sheet of the Commonwealth operation at Richmond, Va.

The plant as it stands today is the outgrowth of long experience the operating staff has had in handling a refractory and clay bearing material. When the plant was first built in 1927-28 the requirements in the district were not as strict as they later became. It soon became apparent, however, that simple washing in a rotary screen was not giving a proper material, free from clay, so late in 1928 the plant was remodeled and two 24-ft. double-screw McLanahan log washers were installed, so that the sand and gravel could be given a thorough scouring before further screening and washing. The installation has proven highly successful and gives a clean gravel and sand that are satisfactory for all purposes. It might be said at this point that the large chunks of clay that are loaded at the pit are for the most part removed at the grizzly ahead of the rotary scalping screen, and the oversize from the scalping screen is also hand-picked to carry the clay balls to waste by an 18-in. belt conveyor, letting the throughs from the scalping screen fall direct to the two log washers, divided about equally. A considerable percentage of the clay material is in balls and is confined to the larger sizes.

Sluicing the sticky material out of the cars



Here the products are scoured in the log washers before washing

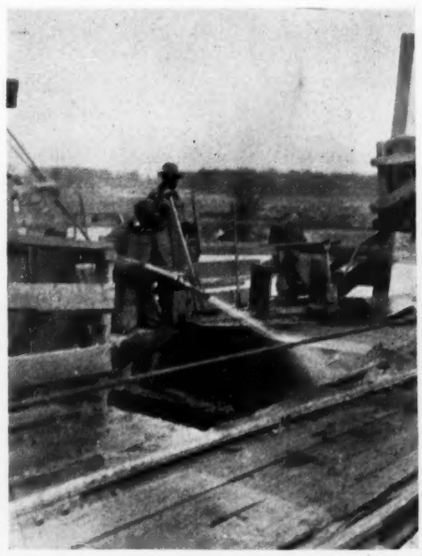
This condition seems to be quite universal in deposits of this nature containing clay.

The dragline loads to 4-yd. Western cars and the pit material is transported to the foot of the incline by either a Baldwin or a Vulcan steam locomotive in trains of six or more cars. The cars are hoisted, three cars at a time, up a short incline to the grizzly ahead of the 3x12-ft. rotary scalping screen.

The material in the cars at times contains so much clay and sticky material that it is necessary to sluice out the cars with a fire hose, mounted at the dumping floor of the plant for that purpose. The grizzly is spaced at 8-in. centers and is made of standard grizzly bars. Any material that will not pass the grizzly is hand raked on to a steel plate and shoved off the trestle to the ground. A single-drum hoist directly connected to a 50-hp. Westinghouse induction motor is used for pulling the cars up the incline.

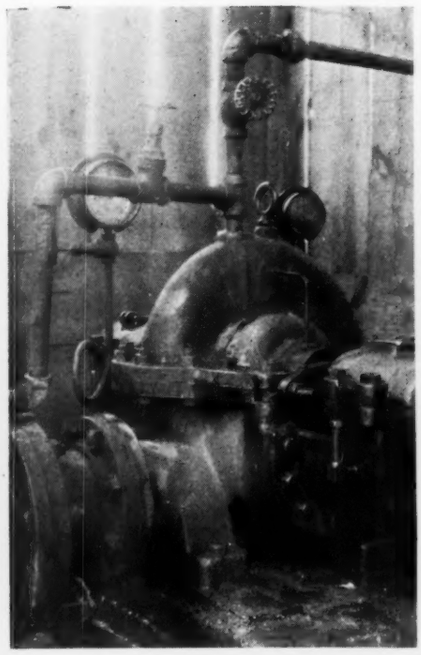
Sand drag in the foreground is used for scouring the coarser sands and does not act as a classifier in the ordinary sense

The trestle in the foreground is used for carrying the aggregate to the stock pile by means of a car and endless cable



Sluicing the clay-gravel through the primary grizzly and into the scalper screen

The material passing the grizzly is sluiced into the rotary scalper that has 2½-in. round perforations its entire length. The oversize falls to a short horizontal sorting belt from which clay balls are hand picked. The clay material is cast on to a second horizontal but



One of the two centrifugal pumps that bring water from a worked-out portion of the pit

longer 18-in. belt conveyor that carries the material to a worked-out portion of the pit where it is wasted. The clay is allowed to either pass off the end of the belt or is scraped off by a wood scraper mounted at an angle above the conveyor belt.

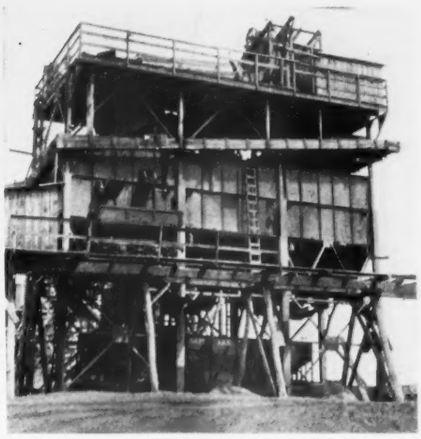
The gravel oversize, that is, material larger than will pass the 2½-in. openings in the scalper, is allowed to remain on the first

Side view of the washing plant and steel bins

short belt conveyor and is discharged to a 12-in. by 24-in. Champion jaw crusher, set to deliver a 2-in. product. The discharge from the jaw crusher and that from the scalper is split by a suitable baffle and sent to the two 24-ft. log washers. The washers are inclined at an agle of about 10 deg., with the gravel discharging at the high end. By the time the material has passed through the logs any adhering clay has been put in such a condition that subsequent washing at the rotary sizing screens gives a clean product.

The log washers and the rotary screen are all driven by a 100-hp. Westinghouse motor through a countershaft and gears and pinions. The jaw crusher is belted to a 20-hp. Century Electric Co. induction motor.

The log washers discharge over a short launder in the bottom of which is a 3/16-in. mesh screen with the oversize passing to a 24-in. inclined belt to the rotary sizing screen. The launder acts as a dewaterer and at the same time removes the bulk of the sand, especially the coarser sands which flow to a home-made drag classifier. The driving mechanism and chains of this drag are Link-Belt equipment. This drag, however, acts not as a classifier but as a scourer of the



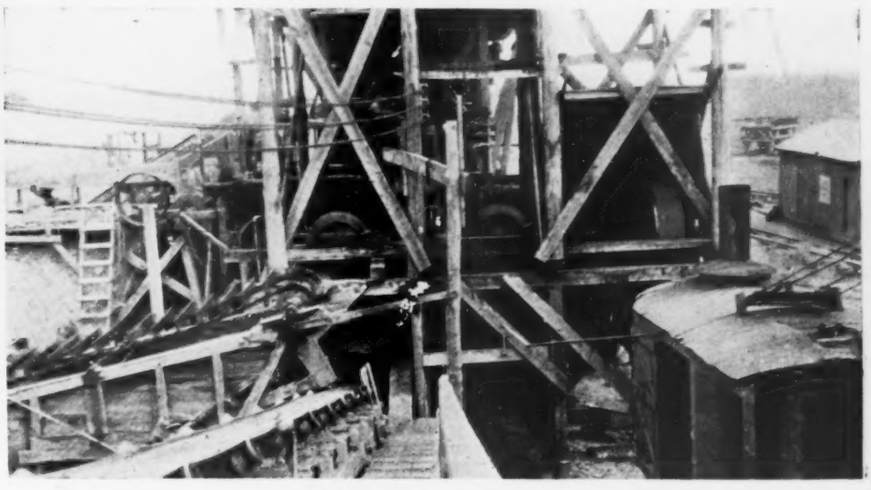
Steel bins under the rotary sizing screen and loading directly into the cars which are handled by an endless cable

sand, for the drag product is discharged back to the same 24-in. belt serving the rotary sizing screen that was mentioned as offbearing the gravel from the log washers. In other words, the drag frees the sand from the clay and puts it in shape for the classification that follows. The overflow from the sand drag passes back to the waste ponds. The primary inclined belt conveyor is driven by a 40-hp. Westinghouse motor, 220-volt, 60-cycle, 3-phase. The same motor drives the single sizing screen.

The wooden bin at left is the home-made sand classifier used for settling the fine sands

The sizing screen is a 4x24-ft. Telsmith rotary, and has 1¼-in. round perforations for its entire length. The outer jacket has first 18 ft. of ¼-in. round openings, then 1 ft. of $\frac{7}{8}$-in. round holes and lastly 5 ft. of ¾-in. round perforations. Water is sprayed on the material in the rotary screen by a pipe through the long axis of the screen.

The sand passes to three Telsmith cones, all in parallel, there being two No. 7 cones and one No. 5. The overflow from these cones joins in a common launder and passes to a home-made settling bin, that rests on the ground below the main washing plant, from which the fine sizes of sand are secured. The overflow from the home-made classifier passes back to the sand drag. The oversize from the end of the rotary screen is chuted to a Telsmith fine reduction crusher and re-



The drag scraper at the left discharges back to the belt conveyor serving the gravel plant. A glimpse of the log washers in the main structure

duced to 1¼-in. with the discharge of the crusher falling to an 18-in. belt conveyor that elevates and conveys the material to a point where it discharges back to the primary incline belt conveyor, and goes back to the classifying screen.

Water is secured from a worked-out portion of the pit by two Dayton centrifugal pumps, one an 8-in. and the other a 6-in.

One of the transit mixing trucks

pump, with the former direct connected to a 60-hp., type CS, Westinghouse induction motor and the other direct connected to a 40-hp. motor of the same make.

The sand from the three cones and the sized gravel fall to seven Butler steel bins that are mounted over the rails of the switch serving the plant so that cars can be loaded direct. Trucks can load from either side from suitable chutes and any excess gravel can be drawn to a 4-yd. Western car, mounted on a trestle and transported to storage space provided at one end of the yard. The car is pulled back and forth over this trestle by a small hoist and an endless cable. The reclaiming from the stockpile is done by a Browning, railroad-mounted crane using a 1-yd. Hayward bucket.

Ready-Mixed Concrete

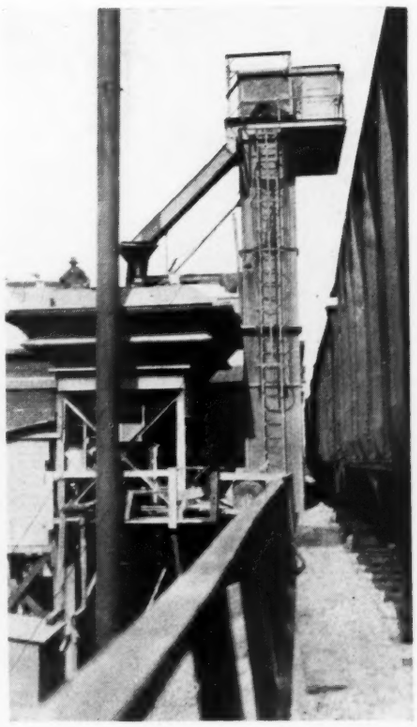
The same interests that control the Commonwealth Sand and Gravel Co. operate a ready-mixed concrete plant at 2100 West Leigh street, Richmond, under the name of the Ready Mixed Concrete Corp.

The aggregate for the central mixing plant is delivered to the plant in bottom-dump standard-gage gondolas, which discharge to wood bins beneath which runs an 18-in. belt conveyor that delivers the aggregate to a bucket elevator serving steel bins over the batchers. The mixing plant was supplied by the Blaw-Knox Co. using the inundation system for proportioning the sand and water, and weighing the coarser aggregates. The plant has a single 2-yd. Ransome mixer. Bulk cement is used. It is hauled to the plant in box cars where they are unloaded by wheelbarrow and hand shoveling. Any excess cement is stored on the floor of a reinforced-concrete warehouse from which the cement is later reclaimed by the same methods as are used for unloading the bulk cement in the first place.

The company has 14 delivery trucks having the Blaw-Knox agitated bodies, each truck holding 2 cu. yd. In addition to this the company has two 1-yd. mixing trucks.

The central mixing plant has a capacity of 400 cu. yd. per day and is the only mixing plant in Richmond. B. C. Rolfe is superintendent of the plant.

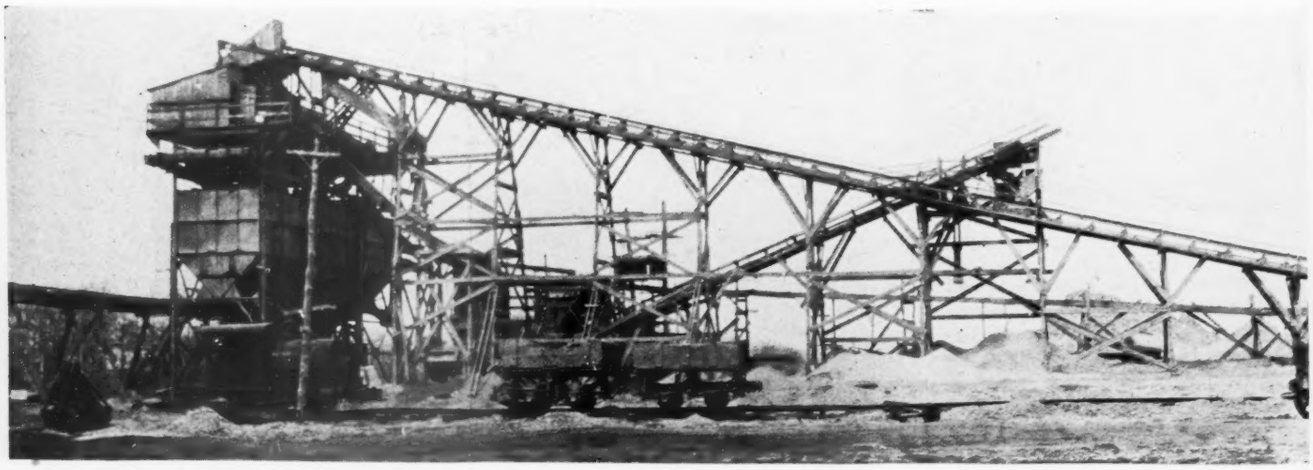
One interesting development here has been the request of the users of ready-mixed concrete to match the color of previously poured concrete. Where a new structure is tied into an older one there is apt to be sharp differences in the colors of the two concretes unless care is taken in preparing the aggregate and in using the proper shaded cement. These color matching problems are quite common and are met by preparing in the laboratory test panels using different brands of portland cements and aggregates until the proper shade is attained, after which the material is prepared from the laboratory specifications in the central mixing plant.



Bucket elevator at the mixing plant of Ready Mixed Concrete Corp.

E. W. Dienhart Joins Potts Company

E. W. DIENHART, at one time with the Cement Products Bureau of the Portland Cement Association, and more recently with the Hydraulic Press Brick Co., Cleveland, Ohio, has been appointed sales engineer of the H. H. Potts Co., concrete products division, Chicago, Ill. Mr. Dienhart will specialize in sales promotion, engineering, technical and service work relating to "Pottsco" lightweight aggregate.



Side view of the washing plant showing the incline to the primary screen and the one leading from the secondary crusher

Mid-Season Review of the Aggregate Industry in the East and South

Personal Observations on Business Generally —And on What the Producers Are Doing

By Walter B. Lenhart
Associate Editor, Rock Products

LOOKING BACK over experiences in visiting a large number of plants, in the South and East during the past several weeks the conclusion is that their chief problem was not one of production but of sales. True, the ever present problem of low-cost production of high grade material was receiving attention, and old and costly methods of production at practically every plant were receiving serious consideration; but the thought uppermost in the minds of the producers was one of market capacities and probable sales. In other words, it was: "We can produce the material, but will we be able to sell it this year?"

Most of the producers contacted were aware of the extensive travels that an editor of ROCK PRODUCTS makes (the material for this and other articles covered three and one-half months of time and adventures in 20 states), and invariably questions would be asked about general business conditions in other localities. There was an intense desire, bred perhaps from uneasiness, to know what the other sections were doing. "Is the aggregate industry going to be good or not during this season of 1930?" was a frequent question.

To judge the amount of business or to generalize about business conditions from such personal contacts is a very uncertain method of arriving at an answer to the query. For instance, of two operators with plants of about equal capacity and in the same town or city; one might be enjoying a large volume of business and the other comparatively little. Similarly, one district in a state might be booming, and another district dormant. Likewise, by states, business in Louisiana might be good, while in the adjoining state of Mississippi, business might be very poor. So to judge from travel and personal contact, if the business in general is on the upgrade or not, is only at best to offer a personal opinion. However, taking a broad view, with these preliminary statements, it may be said that in Texas business is fairly good; in the South Atlantic states, very poor, in fact, business there seemed at the bottom with the exception of two areas, namely in the vicinity of Birmingham, where business was fair; and at Tampa, where, due to activities in the phosphate field, that city had become one of the bright spots in the business lull in the Southern States.

As one travels north through Georgia,

Van Sciver plant of the Warner Co. at Tullytown, Penn.

Crushing plant of the Berks Cast Stone Co., Reading, Penn. This company operates a concrete products plant to dispose of its fines

extreme eastern Tennessee and Kentucky, the general conditions gradually change from poor to good. Swinging east, through West Virginia, Maryland, Pennsylvania, New York and the New England States, the outlook for the aggregate industry looks very favorable. True, there are many plants idle, because of recent consolidations, with only the more economical plants operating; yet in these cases the plant that is operating is usually working to capacity, in many cases, and no doubt profitably too. With the idle plants, held as a sort of a reserve, it can be truthfully said that there is little room for more plants for the sake of increased capacities; for in all the states visited there was capacity several times the present market consumption. Nevertheless, there were several new plants just placed in operation or about to be placed in operation, and a multitude of operators had made changes in their plants of major importance, so as to produce cheaper and better. In other words the industry is far from stagnant in regard to new plants and plant replacement expenditures.

While it is not the intention to mention all the plants visited in this brief review, a few of the outstanding or typical operations are mentioned to show the trend of these developments in the aggregate industry.

Everywhere producers are much interested in mergers, consolidations, sales corporations, etc., as a possible help in combating the problems of overproduction and low prices, so editorial observations on the subject are not out of place at this time.

What Has Been Accomplished in More Orderly Marketing?

In our annual review number each year we have given resumés of consolidations, mergers, etc., that have taken place during the particular year. What is the effect of these mergers and consolidations on the industry? Have they been successful, how were they worked out in the first place, and what has been the result of such combinations? These are other questions that interested producers have repeatedly asked, so it is interesting to note that in one southern state where the rock products industries were in an extremely low and demoralized state, not only during the past year but for the past several years, a marketing method has been worked out successfully and has stabilized that particular industry during the peculiarly trying times of the past 12 months.

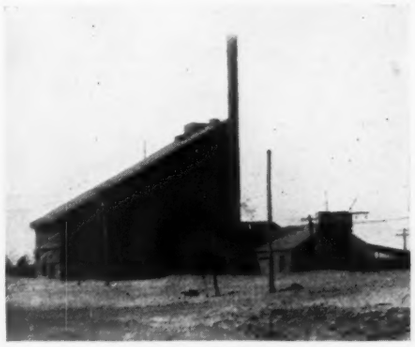
Combination in Sales Organization

This particular group of producers first tried a local trade association, but it proved unsatisfactory, so a sales corporation was formed with all those interested selling to the sales corporation at a base price. The stock in the sales corporation was issued to the members and pro-rated on the basis of each member's 1926 production (the last *normal* year); that is, the amount of stock each member received in the sales corporation was governed by percentage of his 1926 production to the entire production of the territory. The sales corporation does all the selling, although the members can quote prices, and in the event a sale is made, the sales corporation buys the material from the producer who is most favorably situated as regards freight rates, etc., and pays him the base price. Thus the producer has two possible sources of profit: (1) That obtained by producing material at a figure below the base price and (2) that from dividends on his holdings in the sales corporation. If a new member were to be taken in, present share holders would have to reapportion the stock.

New crushing plant of Bethlehem Mines Corp. at Steelton, Penn.

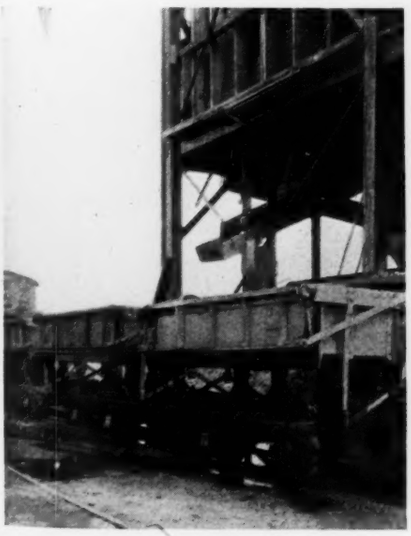
The sales corporation idea, after several years' trial, has really saved the industry, regulated production, reduced selling costs and maintained good will among its producer members. It was pointed out that under this arrangement a producer could close his plant entirely if necessary and yet share in the profits of the industry. Incidentally, there is a similar set-up of aggregate producers in one of the West Coast cities, which has also operated unmolested and successfully for the past year or two. Similar organizations have been tried and have failed to work in other localities.

Apparently, such sales organizations can succeed and stay within the anti-trust laws if their membership does not include *every* producer. In other words they are not in the legal sense actual monopolies. They

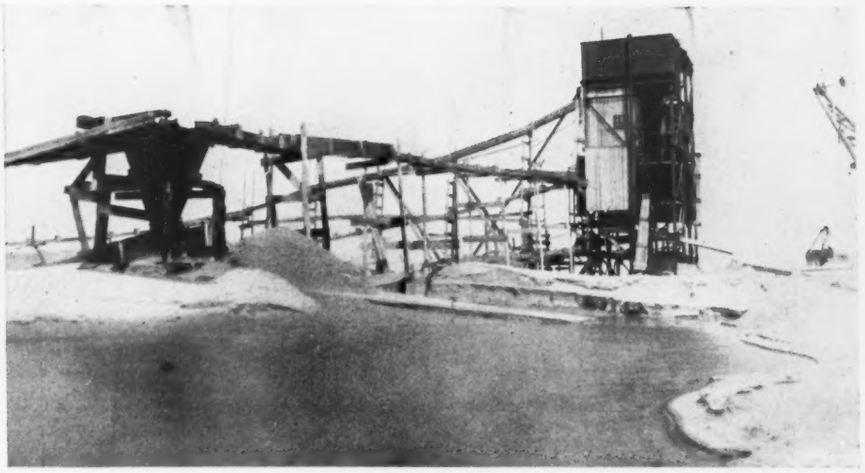


Dryer and dry screening plant of Menantico operation

must also be fair in the matter of prices and pass on to the consumers some of the very real economies possible through the concentration of marketing and producing facilities. These are and always will be their answer to alleged charges of being "combinations in restraint of trade." If they are honestly designed not to be such, and are conducted openly, apparently they have little to fear.



Steel cars hauling sand to the dryer at the Menantico Sand and Gravel Co. plant, Millville, N. J.



Screening plant for the preparation of special sand at the Menantico plant

Combinations Through Mergers

In the East, one merger in the crushed-stone field resulted in the closing down of about half of the company's plants and the operating of only two plants at the present time, at or near capacity. At the same time, however, all of the other plants are being kept in first-class shape so that at a moment's notice, should the volume of business justify it, these plants can start production. Perhaps because of this condition that particular district as yet has not been the scene of any new promotions which might otherwise be expected to make capital of a merger of this kind.

In the sand and gravel industry, an important consolidation in Virginia has resulted in more economic production and more stable conditions. This company operates several plants, formerly competitive, some under a lease agreement.

New washer under construction at Menantico operation

In the eastern Pennsylvania or Philadelphia territory, on the other hand, the merger of the two principal producers of sand and gravel, about a year ago, has undoubtedly aided the birth of two new producing organizations. One of these, when visited, was preparing to start production and no doubt by the time this is published this new corporation will be an actual producer. This company, the Eastern Sand and Gravel Co., Orthodox street and Delaware River, Philadelphia, recently launched at Wilmington, Del., a new digger type dredge having an all-steel hull and using rotary and Niagara vibrating screens mounted on the deck. The dredge was built by the Dravo Contracting Co., Pittsburgh, Penn., and in a later issue we expect to publish a complete description of this rather unusual floating sand and gravel plant.

At Bristol, Penn., the Bristol Sand and Gravel Co. has started a new washing plant. A description of this operation was published in Rock Products, May 10, 1930. This company is at present opening up a pit using a power shovel but later expects to install a dredge.

The largest sand and gravel plant of the Warner Co., the Van Sciver plant at Tullytown, is one of two of the company's main producing units in the district, and since the plant was taken over by the Warner

Pumping 15,000 g.p.m. at the H. E. Millard quarry, Annville, Penn.

The quarry which is being reopened by the Oldham Granite Stone Co. at Phoenixville, Penn.

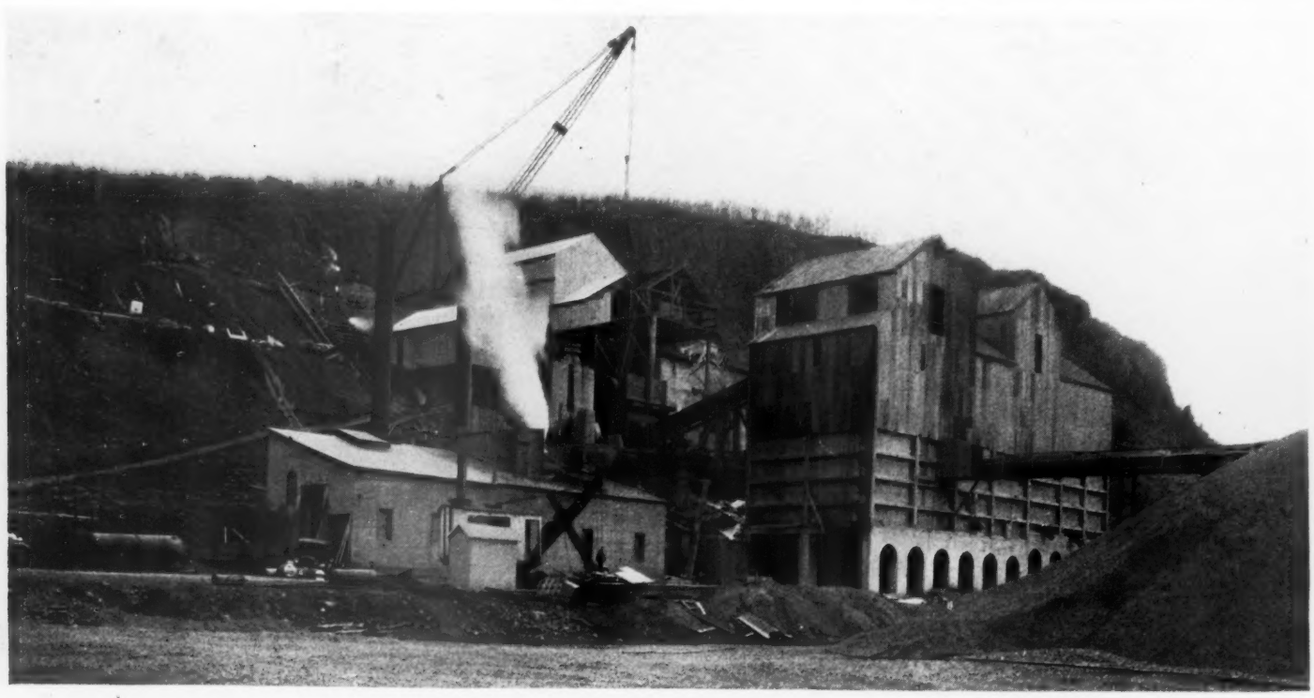
The old Howellsville, Penn., quarry, formerly owned by Sam Givens, now operated by W. Ellis Johnson

Co. unexpectedly large tonnages have been produced without installing additional equipment, by systematic production methods and the co-operative efforts of the operating staff. This plant, probably the largest single unit in the sand and gravel industry anywhere, has an actual productive capacity of 1000 tons per hour from the digger dredge and 300 tons per hour from the pump dredge. And it can be operated day and night. A description of this unusual and interesting plant will be published in a forthcoming issue.

In the February 7, 1925, issue of Rock Products, we published a description of the Menantico Sand and Gravel Co. operation at Millville, N. J. The operations at present are practically the same, except that the dredges and plant have been recently changed from steam-engine to electric-motor drives on the two dredges and in the screening plant.

There are two dredges, each having 12-in. pumps designed by the Morris Machine Works but equipped with Taylor-Wharton manganese-steel liners. The dredges deliver to shore plants of simple design, consisting of a broad, gravity, dewatering and sand-separating screen having ¼-in. mesh. This screen is approximately 20 ft. wide. The fines pass to modified Link-Belt sand cones, whose discharges converge direct to bins. The sand cones have baffles placed 10 in. from the overflow edge, and raising or lowering these controls the amount of fines retained in the settled sands. The oversize passes to rotary screens that produce pea gravel, ¾-in., 1¼-in. and 2½-in. sizes. The sand is hauled to the dryer by a Plymouth

Left to right, J. C. Acker, Chester W. Warren and "Bud" Roberts of the Oldham Granite Stone Co., and F. J. Pratt, Good Roads Machinery Co.



The Middlefield, Conn., plant of the Connecticut Quarries, Inc., which is undergoing extensive alterations

8-ton. locomotive using 3-yd. Western cars.

The water and rejected sand from the cones flows to ponds and is used as a source of material for foundry and other special sands. A pump delivers this product to a separate plant where the material is received in a steel cone that feeds a Hum-mer screen. The oversize falls to a concrete-lined pit while the fines flow to a series of five Shaw classifiers in conjunction with two Hum-mer screens by means of which five different grades of sands are produced, all of which fall to concrete sumps for reclaiming by a locomotive crane.

There have been no radical changes in the drying practice nor in the dry screening plant. It might be well to recall that the dried sands for sand blasting and other purposes are first screened in two small rotary screens with the oversize going to bins and the fines falling to a series of triple-decked, stationary screens that are about 18 in. in width and about 40 ft. long. By brushing the screens as the material flows down these inclines, a very satisfactory product is produced, and economically.

Drilling snake holes at the W. Ellis Johnson quarry

A Fine New Crushed Stone Plant

A new plant of the Bethlehem Mines Corp. at Steelton, Penn., has recently been placed in operation, and is producing flux stone, commercial aggregate and "Rice Dolomite," as well as stone sand from the fines produced. This plant is a large scale, low-cost operation with many interesting features. It has a 48-in. by 60-in. Traylor jaw crusher as a primary breaker. Robins roll grizzlies and Gyrex screens are used for production of flux stone with the fines (minus 2½-in. material) sent to a novel washing plant for the production of commercial aggregate, sand and dolomite furnace lining. A description of this plant will be published later.

Stripping at the W. Ellis Johnson quarry

Crushed Stone Consolidation Includes Concrete Products Manufacture

The Berks Products Corp. is a recent consolidation that includes the former Fehr and O'Rourke Stone Co., the G. W. Focht Stone Co. and Mays Bros., Inc., all producing crushed aggregate in the Reading, Penn., district.

Most crushed stone producers in this section consider their fines a liability, yet this company, by manufacturing concrete tile with the fines, has built up that department to such an extent as to make the installation of further equipment especially to produce fines advisable.

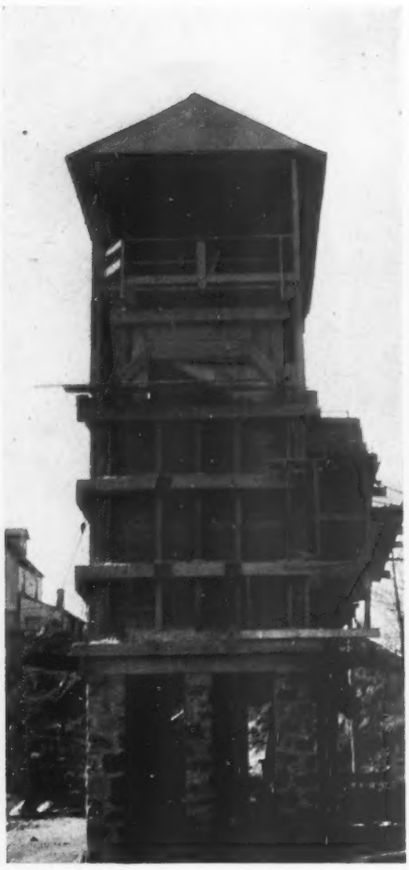
Connecticut Plant Rebuilt

The Middlefield plant of the Connecticut Quarries Co. has been practically rebuilt and outside of a few miscellaneous pieces of equipment from the old plant, has been refitted with new machinery, including a 48-in. by 60-in. Farrel-Bacon jaw crusher, a 7-ft. Symons cone crusher and Niagara vibrating screens, used entirely for sizing. The plant is also changing over from steam to electric drives throughout. It will be described in a subsequent issue.

Pennsylvania Lime and Limestone Operator Expanding Operations

The operations owned by H. E. Millard, Annville, Penn., include the production of high calcium limestone, which is shipped to the cement mills in the Lehigh Valley, commercial aggregate, pulverized limestone of unusual characteristics, and lime. At one of the lime plants, coke is used as fuel in the mixed-feed kilns, probably one of few such

The quarry of the R. H. Johnson Co. at Wayne, Penn., is so closely surrounded by residences that only small charges of powder can be used in conjunction with brush mats



General view of the Johnson plant at Wayne

operations in the United States, although universally recognized as the most efficient method of lime manufacture from the point of view of fuel cost. At his Swatara lime plant, which Mr. Millard recently acquired from W. T. Bradley, extensive alterations and additions are being made which include four new Kuntz gas-producer kilns, the installation of 4-ft. by 30-in. McLanahan slugger roll, followed by a Stephens-Adamson live roll grizzly, with the oversize used for kiln stone and the fines, after screening, for commercial aggregate and cement rock.

The operations of Mr. Millard are so extensive and diversified, and carried on under such very unusual conditions, that a separate article will be written covering them. How Mr. Millard pumps 15,000 gal. of water per minute from his Annville quarry makes an unusual story, especially in connection with his daring in lining the bed of Quitttapahilla Creek for almost a mile with concrete so as to prevent seepage to his quarry from that source. His efforts reduced the pumpage handled from 25,000 gal. per min. to 15,000 gal. per min. Probably this quarry pumps more water per minute than any cement-plant or crushed-stone quarry in the world.

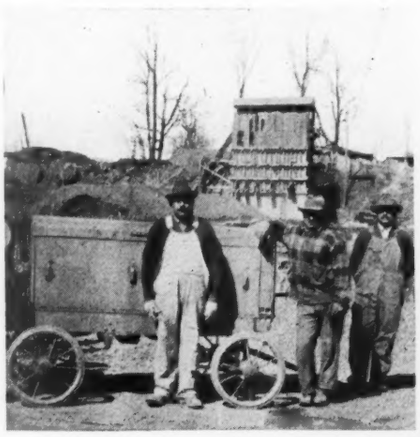
Contractors Enter Stone Business

W. Ellis Johnson has leased for five years the Howellsville, Penn. (P. O. address, Devon, Penn.) plant, formerly operated by Samuel Givens and is making extensive alterations that will, when completed, mean practically a new plant. Mr. Johnson previously was in the contracting, excavating and trucking business and maintained his headquarters alongside of Mr. Given's plant, and this is his first venture in the crushed-stone business.

The plant will be in two units, the first consisting of a 13-in. by 30-in. Farrel-Bacon jaw crusher that feeds a 24-in. reinforced, belt type bucket elevator, which in turn delivers to a 60-in. rotary screen. The second unit has a No. 1040 Good Roads reduction crusher that, by means of a bucket elevator, feeds a 36-in. by 16-ft. rotary screen. The plant is so arranged that the oversize from the first screening unit discharges to the second unit crusher, or the second jaw crusher can be used as a primary unit in the event the first unit is down for any reason. The first unit will produce 2½-in., 1½-in., ¾-in. and chips, and the second unit will produce ¾-in. and chips.

The quarry has some dirt overburden which is removed by a No. 570 Universal crane, but loading in the quarry is at present done by hand. Drilling is done by Ingersoll-Rand drills, tripod mounted, with air supplied by a 9x8-in. Ingersoll-Rand compressor, driven by a 60-hp. General Electric motor.

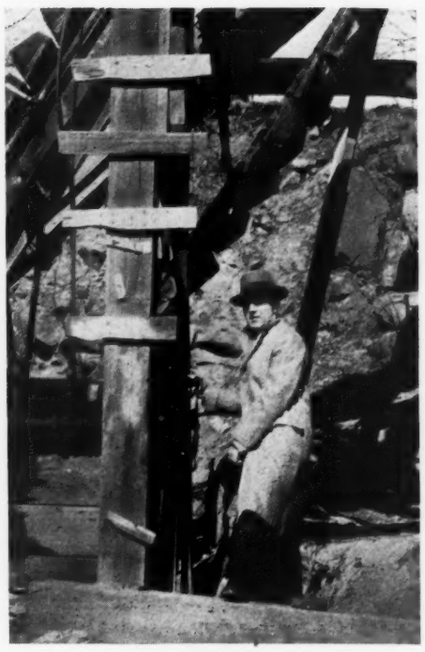
The rock is loaded to Koppel cars which are hoisted up the incline to the plant. The Lidgerwood hoist has been moved from its old location to one closer to the pit so that the operator can at all times see the cars being hoisted.



Some of the quarry men at the Johnson plant in Wayne, Penn.

The bins are of wood and of the laminated or log cabin type. The plant has a capacity of 400 tons per day.

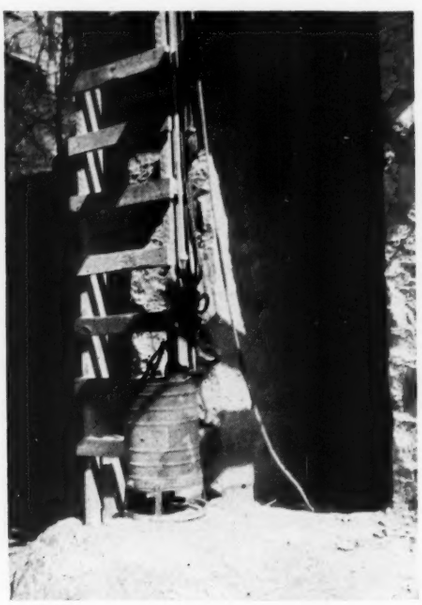
The Oldham Granite Stone Co. is also a "first venture" in the crushed-stone industry by a contractor; it has built a 200-ton per day plant at Phoenixville, Penn., a small settlement in the Valley Forge district.



Mr. Cappela of the Johnson company demonstrates the forced lubrication system used in his plant

The owners of the company are J. C. Acker, Jr., Chester W. Warren, David H. Warren and Wilham T. Warren, all of Phoenixville. The owners were all engaged in hauling and general contracting prior to their entrance in the crushed-stone industry.

The plant was designed by the engineers of the Good Roads Machinery Co., and uses its equipment throughout. At the start, trucks will be hand loaded and will dump to a No. 5 Champion jaw crusher, which discharges to an 18-in. bucket elevator having a center-to-center length of 62 ft. A



Detail of lubricating system at R. H. Johnson quarry. The grease gun is filled by a separate pump, eliminating possibilities of dust contamination

42-in. by 21-ft. rotary screen, mounted over the laminated wood bins, will produce 2½-in. (ballast), 1½-in., ¾-in., chips and screenings.

Air for drilling is supplied by a 240-cu. ft. per min. Schramm compressor. Cleveland Rock Drill Co. drills are used in the quarry.

The bin supports are of brick, making a rather novel and neat method of supporting that structure.

Small Plant Has Unusual Lubricating System

At Wayne, Penn., is a small crushed-stone plant of the R. H. Johnson Co., interesting for the reason that it is one of the few plants in the industry up to this time to use the Keystone system of forced lubrication wherein a special grease is fed to the different bearings from a centrally located pressure pump. From the grease gun there are three main pipes leading to the two jaw crushers and the bucket elevators, with a second gun for the rotary screen. From these main headers, T's take off that connect to the bearing by a short length of flexible hose.

There has always been some question in the minds of operators as to the possibility of the grease following the path of least resistance, but this installation has been in use two years and no bearings have been lost from lack of lubrication. The hoses are changed each year.

A Schramm portable compressor supplies the air for drilling. Besides aggregate for local use, all of which is trucked to points of consumption, the Johnson quarry produces some dimension stone and a special fine aggregate that, owing to its natural bonding or compacting qualities, finds a ready, high class market for tennis courts. This material is simply the screenings which contain some clay.

The plant has a capacity of 200 tons per day.

Legality of War Department's Purchase of Foreign Cement Questioned

THE EXPLANATIONS which have followed the action of the district engineer's office at Portland, Ore., in buying foreign cement for harbor improvement at Coos bay at a saving of $341 on 19,500 bags may raise a question as to the right of army authorities to purchase imported materials for public construction.

Col. G. R. Lukesh, district engineer at Portland, recently wrote both Senator McNary and Senator Steiwer saying that he would have preferred to buy domestic cement for the Coos bay job, but was informed by his superiors at Washington that he was obliged under the law to accept the lowest bid.

After studying the matter, Senator Steiwer is not sure that the advice is right. He has found a paragraph in the army appropriation bill for the fiscal year 1876 which provides that the Secretary of War shall give preference to American materials in all contracts for public improvement, and that all labor thereon shall be performed within the jurisdiction of the United States.

The junior senator has written both Maj.-Gen. Lytle Brown, chief of engineers, and Walter Newton, secretary to President Hoover, suggesting that the authority of that section still holds good, and that a legal opinion should be sought from the War Department and possibly from the Attorney-General's office.

The rigid construction placed upon legislation governing government purchases by the controller-general is likely to lead to disallowance of payment on purchases of foreign materials, Senator Steiwer believes.—*Portland* (Ore.) *Oregonian.*

Ohio Marble Company Enlarges Plant

A NEW electrically powered stone crushing and screening plant has been installed at the plant of the Ohio Marble Co. on Bridge street in Shawnee, near Piqua, Ohio, at an approximate cost of $35,000. The installation was started in March and was completed recently under the supervision of Lawrence E. Townsend, engineer at the plant who supervised the concrete work, elevator construction and the electrical work.

The new crusher and the screening plant will triple the capacity of the plant. To operate the entire plant a total of 410 hp. is required. Officials of the company, headed by Mrs. A. A. Hall, president, announce that a new ledge of stone is to be opened at once and this will produce a Grade A product, the best obtainable, for high class road improvement. It is extremely hard and tough and is used for first-class road construction.—*Piqua* (Ohio) *Call.*

Texas Silica Deposit to Be Developed

J. L. ZALONTZ, Uvalde, Tex., and associates plan to install equipment for developing a large deposit of silica sand which was discovered recently near here. A sample was sent recently to the State Highway Department by Resident Engineer D. W. Hooper, Uvalde, and an analysis showed it to be nearly 100% pure silica. Tests were made and the tensile strength of 1:3 mortar at seven days showed 457, as against 403 for Ottawa sand. Another test showed a tensile strength of 1:3 mortar at 28 days of 552, as compared with 472 for the Ottawa. The report received stated that this was a clean and very fine-grained silica sand which obtains tensile strength fairly well above Ottawa. The tensile strength obtained is said to be very unusual for a sand of as fine grade as this. Specific gravity is 2.69.

Large Deposits of Potash Found in New Mexico and Texas

EXISTENCE in Texas and New Mexico of bedded deposits of potash salts of such thickness and purity that they may be mined cheaply and sold under cost of the foreign product is reported by the Bureau of Mines.

The bureau co-operated with the Geological Survey in an exploration program in these two states, and found that the principal potash mineral discovered, called "Polyhalite," gives promise of economic production of refined potassium salts.

Although transportation charges must be added to cost, it is shown that at present prices, potash salts from Texas and New Mexico can be delivered to the principal markets of the United States more cheaply than foreign salts, the bureau stated.

It is also stated that foreign production costs indicate that, although reduction in the current price of potash salts is possible, conditions in the industry are such that prices are apt to remain fairly stable at present levels so long as the Franco-German sales agreement remains in force, the bureau states.—*Wall Street Journal.*

Shore Protection Structures Made of Concrete

AN EXCELLENTLY illustrated 32-page booklet, entitled "Concrete Shore Protection," has just been issued by the Portland Cement Association, Chicago, Ill.

The booklet deals with water front structures generally, and tells how the protection problem has been successfully handled in various communities. The introduction states that "of all materials available, concrete is the most resistant to the action of the elements, salt water, and other destructive agents. Like any other material, it must be used intelligently, with full advantage taken of present-day knowledge, and with due regard to past experience."

Statistical data, a table of typical specifications for concrete shore protection structures, and a bibliography of reference material intended to simplify the task of making individual research into shore protection problems, is contained in the booklet which is available for free distribution.

Kansas Quarries Get Ballast Order

THE CENTRAL KANSAS QUARRIES CO., Ottawa, Kan., has doubled its capacity in order to fulfill a contract with the Missouri Pacific Ry. for delivery of 200,000 cu. yd. of rock ballast during the next few months. Most of the rock will be used for ballasting operations west of Allen, where 38 miles of new track is being laid, reducing grades and improving the roadbed in general. J. M. Kirk is manager of the plant.

Uniform Aggregate Specifications in Use in Detroit*

Detroit Engineering Society's Efforts to Eliminate Chaotic Conditions in Concrete Materials Field Successful

By L. G. Lenhardt
Department of Water Supply, Detroit, Mich.

BEGINNING at the time that concrete was first used in Detroit, the conditions under which aggregates were supplied were never satisfactory. Practically every architect and engineer had his own specifications, as did the various departments of the city government. The aggregate producers were not long in recognizing this chaotic condition. The enormous volume of construction which has been under way in this city during the last twenty years has been supplied with aggregate purchased, until quite recently, on a sellers' market. Despite multiplicity of specifications, the best any user could do was to recognize this fact and permit a minimum of deviation from what was wanted.

These conditions existed until late in 1924, when the Detroit Engineering Society determined to try to write a specification which would have the approval of both users and producers. A committee representing material men, contractors, architects and engineers was appointed and labored for one year, producing a specification which represented a considerable step in advance.

This specification never had a wide acceptance, partly because those specifying concrete were loath to give up their pet ideas. Briefly, however, the failure of this specification to enlist a larger following was due to a lack of educational work.

About this time there came a gradual awakening to the value of concrete control methods, largely as a result of the efforts of the Detroit Engineering Society in fostering concrete control schools put on by the Portland Cement Association. The department of buildings of the city embarked on a comprehensive campaign for better concrete, and certain organizations such as the Detroit Edison Co., Smith, Hinchman and Grylls, architects, and the Detroit Water Board adopted concrete control methods, with the result that more rigid aggregate specifications began to be written; but again, every organization was working along its own lines. The result was that the multiplicity of specifications became even more pronounced than it was before.

During this time the concrete committee of the Detroit Engineering Society was kept alive and about a year and a half ago started revision of the first specification. This revision was finally approved as given herewith and has been widely adopted. Among those using the new specifications are the following: Detroit Edison Co., Detroit Water Board, Detroit Department of Public Works, Smith, Hinchman and Grylls, architects, and the Ford Motor Co. on its new water intake and tunnel system.

*Reprinted from *Engineering News-Record.*

Aggregate Specifications—Detroit Engineering Society

Coarse Aggregate

General Characteristics

1. Coarse aggregate shall consist of hard, strong, durable pebbles, crushed stone or slag, free from adherent coatings and clay lumps. (If limitation to one or more of above-mentioned aggregates is desired, it shall be definitely specified.)

2. The maximum percentage of deleterious substances shall not exceed the following values:

	Per Cent by Weight
Removable by decantation	1
Shale and soft fragments	3
Coal	½
Thin, elongated or laminated pieces	3

3. Coarse aggregate shall pass a sodium sulphate accelerated soundness test except that aggregate failing to pass such test may be used if it passes a satisfactory freezing and thawing test.

4. Crushed stone for one-course pavement shall show a loss by abrasion not exceeding 3%; for pavement base, 6%.

5. Crushed slag shall weigh not less than 1900 lb. per cu. yd. It shall contain not over 2% of sulphur and it shall be weathered for not less than three months.

6. Wherever in these specifications methods of test or standards are referred to or implied, the latest American Society for Testing Materials standard dealing with such subject shall be used.

Gradings

7. Coarse grading:

(a) Aggregate when tested by means of standard laboratory sieves shall conform to the following requirements:

Minimum fineness modulus, 7.00; maximum fineness modulus, 7.80.

	Per cent
Retained on sieve, 2-in. square openings	0 to 2
Retained on sieve, 1½-in. square openings	5 to 20
Retained on sieve, ¾-in square openings	40 to 75
Retained on No. 4 sieve	95 to 100

(b) Crushed stone or slag, used for pavement, when tested by means of standard laboratory sieves shall conform to the following requirements:

Minimum fineness modulus, 7.40; maximum fineness modulus, 8.05.

	Per cent
Retained on sieve, 2-in. square openings	0 to 5
Retained on sieve, 1½-in square openings	10 to 30
Retained on sieve, ¾-in. square openings	50 to 75
Retained on sieve, ⅜-in. square openings	85 to 100
Retained on No. 4 sieve	95 to 100

8. Medium Grading:

Aggregate when tested by means of standard laboratory sieves shall conform to the following requirements:

Minimum fineness modulus, 6.50; maximum fineness modulus, 7.00.

	Per cent
Retained on sieve, 1½-in. square openings	0
Retained on sieve, 1-in. square openings	0 to 5
Retained on sieve, ¾-in. square openings	10 to 25
Retained on sieve, ⅜-in. square openings	50 to 75
Retained on No. 4 sieve	90 to 100

9. Fine Grading:

Aggregate when tested by means of standard laboratory sieves shall conform to the following requirements:

Minimum fineness modulus, 6.00; maximum fineness modulus, 6.50.

	Per cent
Retained on sieve, ¾-in. square openings	0
Retained on sieve, ⅜-in. square openings	20 to 60
Retained on No. 4 sieve	85 to 100
Retained on No. 8 sieve	95 to 100

Fine Aggregate

General Characteristics

10. Fine aggregate shall consist of sand having hard, strong, durable particles free from adherent coatings, clay lumps and other deleterious substances.

11. (a) The amount removable by decantation shall not exceed 2% by weight. (b) All fine aggregate shall be free from injurious amounts of organic impurities. Aggregates subjected to the colorimetric test for organic impurities and producing a color darker than the standard shall be rejected unless they pass the mortar strength test as specified in section 12.

12. Fine aggregate when subjected to the mortar strength test shall have a compressive and tensile strength at the age of 7 and 28 days of not less than 100% of that developed by mortar of the same proportion and consistency, made with the same cement and standard Ottawa sand.

13. Wherever in these specifications methods of test or standards are referred to or implied, the latest American Society for Testing Materials standard dealing with such subject shall be used.

Gradings

14. Sand No. 1—Structural:

(a) Fine aggregate when tested by means of standard laboratory sieves shall conform to the following requirements:

Minimum fineness modulus, 2.70; maximum fineness modulus, 3.30.

	Per cent
Retained on ⅜-in. sieve	0
Retained on No. 4 sieve	0 to 5
Retained on No. 48 sieve	80 to 95
Retained on No. 100 sieve	95 to 100

(b) At least 15% of the sand shall be retained between each of the following pairs of sieves: Nos. 8 and 14, 14 and 28, 28 and 48.

15. Sand No. 2—Pavement, Mass Concrete, etc.:

(a) Fine aggregate when tested by means of standard laboratory sieves shall conform to the following requirements:

Minimum fineness modulus, 2.60; maximum fineness modulus, 3.60.

	Per cent
Retained on ⅜-in. sieve	0
Retained on No. 4 sieve	0 to 10
Retained on No. 48 sieve	80 to 95
Retained on No. 100 sieve	95 to 100

(b) At least 10% of the sand shall be retained between each of the following pairs of sieves: Nos. 8 and 14, 14 and 28, and 28 and 48.

Activities of A. S. T. M. Committee on Aggregates

COMMITTEE C-9, on Concrete and Concrete Aggregates, of the American Society for Testing Materials has 81 independent projects under consideration covering a wide range in the field of concrete and concrete aggregates.

The subcommittee on unification of specifications is giving consideration to quality of concrete and its constituent materials, proportioning and mixing, conveying and depositing, forms and curing, and any other factors entering into the quality of the finished product.

Studies of methods for the design of concrete of a given quality are being considered by a subcommittee with the objective of preparing specifications for proportioning. That subcommittee has under active consideration studies of methods of design for flexural strength, methods for securing high-early strength and studies of mortar voids. Several phases of its studies of flexural strength of concrete will be reported upon at the annual meeting of the society in June. This will include information on the effect of moisture content in the concrete at time of test, surface characteristics of the aggregate and quantity of cement, etc.

A subcommittee on strength tests of concrete under the chairmanship of A. T. Goldbeck is carrying out studies in preparing specifications for methods of testing. An important feature of testing concrete in compression is the proper capping of the specimen. Two methods were discussed: one making use of a sulphur compound and the other employing sand properly restrained to prevent lateral displacement. Beam tests were also considered and a tentative method for making beam tests was proposed by the subcommittee, making use of a simple beam subjected to a load in the center.

The subcommittee on specifications and methods of test for aggregates has been particularly active in developing information on such characteristics as soundness, soft particles, relationhip between the resistance to abrasion and strength of concrete, the effect of stone dust, suitability of sand resulting from the crushed stone, slag and gravel, etc. A comprehensive study of methods for determining moisture content was reported upon.

A subcommittee under the chairmanship of F. R. McMillan is giving consideration to the fixing of proper specification limits on extraneous substances in concrete. A progress report on the effect of oil-bearing aggregates was received.

A comprehensive program of study on measurements of materials, mixing and placing of concrete is under way by a subcommittee headed by R. L. Bertin. This subcommittee has submitted a report for publication including a bibliography, summaries of certain articles included in it and a description of several methods of testing for the determination of the proportions of the constituents of fresh concrete. These tests offer a new and useful means of evaluating the quality of concrete while it is being manufactured, thereby enabling the engineer to make corrections in the proportions.

The subcommittee on elasticity and volume changes has submitted a digest of test results on (1) modulus of elasticity of concrete, (2) volume changes on cements, mortars and concretes produced by moisture and temperature changes and (3) Poisson's ratio for concrete. Two other reports giving results of quite extensive investigations on the subjects of volume change and of plastic flow of concrete were presented.

An important phase of the work of the committee is that being carried out by the subcommittee headed by C. H. Scholer. It deals with permeability of concrete and at the present time the subcommittee is giving principal consideration to the confusion that arises in the use of such terms as permeability and absorption, particularly to the relationship between these factors and resistance to weathering agencies.

Studies of conditions affecting the durability of concrete are in charge of a subcommittee headed by Ephrem Viens. This subcommittee reported on a nine-day inspection tour covering structures in Ontario and Quebec. This inspection gave a splendid opportunity to study concrete exposed to severe winter conditions.

Among other subjects on which progress reports have been made are the studies of apparatus for testing; curing of concrete; workability of concrete, and admixtures. It is expected that the annual report of the committee this year will contain an unusual amount of valuable data; most of it, however, will be in the form of information rather than specifications. The committee made revisions in several of its existing standards and tentative standards, and will recommend the advancement to standard of a number of tentative methods and specifications.

French Cement Production

FRENCH production of artificial portland cement, Grappier cement, natural cement, slag cement, white cement and fused cement totaled 27,659,950 bbl. in 1927, whereas the capacity was about 41,423,700 bbl.

Canadian Gypsum Producer Holds European Trade Conference

IN HOLDING a European trade conference dealing solely with Canadian gypsum products, Gypsum, Lime and Alabastine, Canada, Ltd., Paris, Ont., is sponsoring one of the most aggressive efforts to further Canadian export trade that has made its appearance for some time. The conference, held in London, England, on April 30, was organized entirely on the initiative of the Gypsum company. It brought together representatives of all sections of the British Isles as well as a great portion of the Continent for the single purpose of studying the use of these Canadian products and furthering their sales abroad.

"With Canada's rise to a position of important trading nations of the world, manufacture in Canada can no longer be taken to mean only manufacture for Canada," said R. E. Haire, president of Gypsum, Lime and Alabastine, Ltd., in announcing the European trade conference. While this is true, it is noteworthy that Mr. Haire's company is taking such aggressive methods.

Exports of Gypsum, Lime and Alabastine, Ltd., have developed with exceptional rapidity in the past three years. In that period trade in Canadian-made gypsum products has been developed with 35 other countries and has increased so rapidly that Gypsum, Lime and Alabastine, Ltd., has now become the largest exporter of these materials in the world.

The London conference should have a beneficial effect on sales. Such an approach to business men in England and Europe should be effective, and while prospective customers will learn many facts about gypsum products, executives of the company will be in a good position to investigate the possibilities of new markets. J. F. Cameron, general sales manager, and H. H. Phillips, export manager, addressed the conference.

Mexican Company Expands

THE CAPITAL STOCK of the Compania Cementos Portland de Monterey has been increased from $1,230,000 to $2,200,000 and the capacity of its cement manufacturing plant at Monterey, Mexico, will be doubled by increasing it from 1000 bbl. to 2000 bbl. daily. This increase will necessitate construction of a second unit of equal size with the existing kiln, a raw grinding mill, a cement grinding mill, storage silos and bins, and a system of belt conveyors.

Officers of the company are as follows: President, Lorenzo Zambrano; vice-president, Prisciliano Elizondo; treasurer, Adolfo Zambrano; secretary, Jose Zambrano Gutierrez. Directors: Pablo Salas y Lopez, who is the general manager; Rodolfo M. Garcia, manager for the Banco de Nuevo Leon; Victor de Lachica, manager for the Fyusa; Lic. Elias Villarreal, and Thomas Williams.

A 60-ft. trestle erected three hours after reaching its destination

Method of transporting a 50-ft. trestle

Trestle Construction and Transport From Quarry to Plant

By J. J. Grierson
Engineer, Noarlunga Sand Co., Ltd., Seacliff, Australia

THE WRITER recently had some aerial ropeway construction work for conveying limestone, four miles from quarry to cement works. The ropeway is in three sections with two combined tension and anchor stations in centers; the track cable being finally anchored at the loading terminal and tensioned at the unloading terminal.

The tension station and some of the trestles were constructed of steel and completely electrically welded. The transport of these towers at first seemed a problem. The country was undulating and rough, but a scheme was worked out which was very successful. The trestles, of which there were four, one 40 ft., one 50 ft., one 45 ft. and one 60 ft.

Steel trestle erected and in position 60 ft. in distance and showing protection bridge over railway line

high; also the two tension and anchor stations were built complete at the cement company's workshop, where electric welding and oxy-acetylene cutting plant were available.

A trestle left the works in the morning and was in position and erected the same evening. It was necessary to cross three main roads and a railway line and pass down some very steep grades to get to the trestle positions. On the steepest grades the speed was retarded by means of rope secured to axle and the drum of a crab winch.

The 60 ft. trestle had to be transported 3½ miles and was constructed complete, even to the oscillating saddle, before being mounted on the wheels.

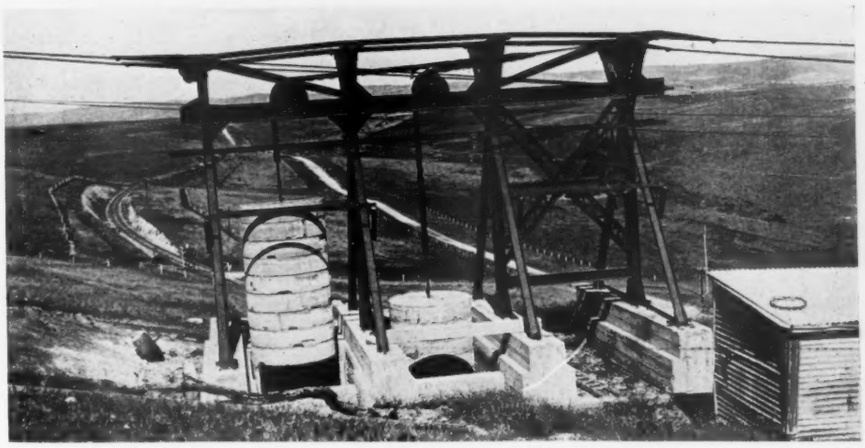
The four wheels and under carriage were removed from one of the works' standard trolleys. The rear wheels were fitted to a special axle and secured to the trestle by means of U-bolts. The undercarriage was fitted with a piece of circular plate, 2 ft. in diameter by ¼-in. thick; a similar piece being secured to one of the top sides of trestle by countersunk bolts.

A hole through the center of the plates, through which the king pin passed, completed the outfit.

The jacks and gear were packed and went out with the trestles, and on reaching their destination they were pulled close to the foundation and lifted direct off their carriage.

The photos shown clearly show the trestles being transported and erected. The system adopted was most satisfactory and effected a considerable saving.

A 60-ft. electrically welded steel trestle passing over a plowed field



Welded steel combined tension and anchor station. The full side weighs 15 tons; the empty side, 8 tons

Canada Cement Outlook

ALTHOUGH it is yet early to forecast accurately the probable showing of Canada Cement Co., Ltd., for the current year, ending November 30, next, present indications are that company will do fully as well as last year, and probably better.

An important factor, influencing Canada Cement's business is that despite temporary slowing up in general business in the Dominion, due largely to the grain tie-up, most of the Canadian provinces are planning record highway construction programs for this year, to attract the increasing important tourist business to their respective territories. Also, the government and private companies are going ahead with large construction projects, including power developments and various types of building operations.

The company's business is most active of course during the summer months. Shipments during the first two or three months of the fiscal year probably represent no more than 10% of the year's total. Winter production of the company is despatched to various central distributing points, to be ready when construction season starts. It is understood operations were maintained at a relatively high level during the past winter in anticipation of good business this summer.

The company has virtually completed its program of plant improvement and betterment of distribution facilities. Last year reconstruction of the Hull, Que., plant was completed, and previously improvements were put into effect at the Exshaw, Winnipeg and Port Colburne plants. At present the Longee Point plant at Montreal is being converted to the "wet" process and this change will be completed within a year.

The company also has improved its distributing facilities in eastern Canada, especially in the Maritimes. At Halifax and St. John storage bins and packing plants have been erected and within a few months similar equipment will be completed at St. John. A 3500-ton vessel has been placed in operation to supply these distributing plants with cement and to bring back from Nova Scotia gypsum used at the eastern plants in production. These changes in distribution facilities in the Maritimes should stimulate export business.—*Wall Street* (New York City) *Journal.*

New British Columbia Plant

MARKING its most important expansion project in years, the firm of Gilley Bros., Ltd., New Westminster, B. C., is preparing to open up a new gravel pit at the junction of the Fraser and Pitt rivers. This pit is on Murray Hill and covers about 350 acres, less than three miles from Port Coquitlam. The gravel claims have been secured by Gilley Bros. and preparations are being made to install extensive equipment. It is expected that production will start within two months. This is the first land gravel pit to be operated recently by the firm. At present the company's dredges are taking gravel and sand from the Fraser river flats at Nicomen Island. These dredges will continue operations but the new pit will provide a valuable added supply.

Keeping pace with the greater gravel facilities, the rock crushing plant on Pitt river has also been improved and extended this year.—*New Westminster* (B. C.) *British Columbian.*

New Oregon Gravel Plant Begins Operations

KLAMATH FALLS' (Ore.) newest industry is now in operation. The first scow-load of Williamson river sand was brought down the river and lake Thursday by the General Sand and Gravel Co. and is being sold on the local market.

The bunkers and equipment for handling sand and gravel of the Porter Construction Co., one of the pioneer contracting firms of the county, have been leased by this new company and distribution of the new sand is being made from the bunkers at Klamath and Market streets.

Clean in the bank where the Williamson river stored it years ago, eight miles from Upper Klamath lake, the sand is given an additional cleaning by washing. It is then placed on the barges by gravity flow and towed down the river to the lake and thence to the boat landing at Shippington. It is being graded for concrete and masons' sand at the bunkers.—*Klamath Falls* (Ore.) *News.*

Sand and Gravel Association Directors Hold Mid-Year Session

Progress on Various Activities of National Organization Discussed at Milwaukee, Wis., May 14 and 15—St. Louis Gets 1931 Convention

By Edmund Shaw
Contributing Editor, Rock Products

THE NEXT ANNUAL CONVENTION of the National Sand and Gravel Association is to be held at the Jefferson Hotel, St. Louis, Mo., January 27, 28 and 29, 1931. This was decided upon at the mid-year meeting of the board of directors of the association, held at Milwaukee, May 14 and 15. The board attended to many other matters important to the industry. It decided to study the credit bureau system (which the general contractors of the country are urging upon producers and dealers everywhere) a little longer before committing the association to recommending it. It considered uniform cost accounting systems and the committee in charge will probably have one ready to submit to the membership in a month or two. It put off holding a trade practice conference for the present, but expects to hold one at the time of the annual convention. Engineering and research received a considerable amount of its attention, along with the settlement of bankrupt contractors' bond claims and like matters of general interest to the industry.

Four former presidents of the association were present: V. O. Johnston, Alex Dann, Hugh Haddow and R. C. Fletcher. President Potts appointed them a committee on membership, adding John Prince, former president also, who was unable to be present.

J. L. Shiely, who has served the association so long as treasurer and director, created a stir among his friends by announcing that he would shortly be leaving for Russia, where he is to have charge of all ballast and sand and gravel operations of the Russian Soviet Government in a territory extending from Moscow to Vladivostock. A number of other specialists will accompany him.

Not much time was allowed for social events, but the directors were entertained at luncheon by the Harnischfeger Corp. on May 14 and afterwards were shown through the factory. J. C. Buckbee, a member of the board, was host at a dinner at the Milwaukee Athletic Club the evening of the same day.

Publicity for the Industry

Nobody made a "speech" at this dinner, but Mr. Buckbee made a few remarks in which he said something that the entire industry should take to heart. He urged the need of more publicity for the sand and gravel industry, not with architects, contractors and engineers, who are fairly well informed about it now, but with the public generally, the man in the street, the ultimate consumer, the man who finally settles all the bills for construction, by taxes or otherwise.

Mr. Buckbee said that he had found that even his close friends, men whose general knowledge of affairs he respected highly, had shown a surprising ignorance of the industry. To them sand and gravel was "something that you dig out of a bank. If you were a little producer you dug it with hand labor and if you were a big one you bought a steam shovel because it dug more cheaply." They had no idea of the skill and care and technical knowledge that it took to make the carefully finished product that commercial sand and gravel must be if it is to pass the exacting specifications to today. It is really a manufactured product, and in spite of its low cost and production in large quantities, it must receive the same care and skillful attention in manufacturing that any specification product must receive.

Trade Practice Conference

The proposal to hold a trade practice conference had been carefully considered by the committee, and Hugh Haddow, chairman, said the committee thought the only time to hold it successfully would be during the next annual convention, as the greater part of the membership would be present then.

Whether such a conference would be held under the auspices of the Federal Trade Commission would depend somewhat on circumstances. At all events a meeting should be held to discuss what the members considered ethical and unethical in business, and some sort of code could be set up.

Credit Bureaus

Almost one entire session was given to a discussion of credit bureaus. Alan Parrish, representing the Associated General Contractors of America, was present to try to persuade the directors that the aggregate producers should form credit information bureaus in co-operation with the contractors of their respective states. Mr. Parrish is an Illinois contractor, and in his state producers and contractors have organized such bureaus that, he said, were working well. Other states in which there is partial credit bureau organization, or in which contractors and producers are considering the matter with a good chance of its being adopted, are New York, Texas, Iowa, Pennsylvania, Tennessee and Minnesota.

The building situation at the present time, in Mr. Parrish's opinion, is little less than chaotic. He called it not a buyer's market or a seller's market but "a giver's market," because producers were apparently too anxious to dispose of their materials and contractors their services. The effect has been that material producers and dealers, according to Mr. Parrish, have been too free with credit; and contractors have "over-extended" themselves, working on credit supplied by material dealers. This condition the contractors want to see remedied, so that the contractor who pays his bills regularly, and gets credit from his bank and not from material dealers, will not be confronted by an unfair advantage when it comes to bidding.

Mr. Parrish read the agreement used in Illinois, and the following paragraphs substantially explain the organization of the co-operative credit bureau in detail:

"It is recommended by the contractor group that all material be sold upon a cash discount basis, namely: That for all material shipped in any one month there be granted a substantial cash discount for payment on or before the 15th of the following month. Such account automatically becomes due on the first of the second month following. If payment is not made at that time the contractor automatically is placed upon cash on delivery basis.

"In order to promote confidence and effect a general understanding, a uniform system of accounting should be established. The action on an account should follow this routine: As of the first of the month, for all material shipped in the preceding month an invoice in duplicate is rendered by the producer to both the consumer and the credit bureau; as of post mark of the 15th of the month, check for the gross amount of the above invoice is to be in the hands of the bureau, and if proper in all details, marked approved for discount and immediately forwarded to the producer. The producer upon receipt of the check immediately issues his own check for the cash discount in the name of the consumer, and mails it back through the bureau, where such transaction is closed. If settlement for such account is not made in the gross amount by the first of the fol-

lowing month, post mark to govern, the bureau immediately ascertains from both producer and consumer the status of such account, and if payment has not been made that consumer is to be placed upon a cash-in-hand basis, and all producers who are a party to this premise are upon request advised; and the producer is responsible for legal steps to protect his delinquent account.

"Upon the notification of charges by any producer or contractor of a violation of terms by either producer or contractor, the bureau has the right to have a certified public accountant investigate the books of either or both to determine the veracity of such charges. It is recommended that as of the first of each month each producer or contractor ask for this or any other information in the possession of the bureau which might be of value to himself.

"It is suggested that this cash discount for payment on or before the 15th of the month should be 10c per ton. It is proposed that the producer at the time of settlement of monthly accounts hand back to the bureau 5c per ton for all business concerned, and that such funds be used to defray the expenses of the operation of the bureau; and that the balance become the joint property of the industry, to be used for promotional, educational, legislative and any other necessary expense approved by the joint committee from the sand and gravel, stone and contracting industries.

"Membership in these three groups, namely: The contractors' group, the sand and gravel group and the crushed stone group is left open so that any individual or firm agreeing and so subscribing to the agreement may become a member."

J. L. Shiely said the contractors and producers in Minneapolis and St. Paul had such an agreement and it was working well. He was not in favor of a credit bureau at first but was later persuaded to join it and was very glad he did. Victor Cordes spoke in favor of credit bureaus, giving his experience with one which was working well in Memphis, Tenn. V. P. Ahearn, executive secretary of the association, to give a clearer idea of the working of the bureau, asked Mr. Parrish if it could be used in both intrastate and interstate work and was told that it could be. Then he asked what class of work would be included and was told in general it would include all public work. In all these matters the advice of the Federal Trade Commission had been followed closely, and good attorneys had been consulted to see that such agreements were legal in every way.

J. L. Shiely gave his experiences with the system in St. Paul, where he said conditions were much better than before a bureau was established. Henry Battjes said this was true in Grand Rapids, Mich., where the bureau put a contractor on a cash basis after an account was 60 days old. He thought not only a credit bureau but a code of business ethics was highly desirable. R. J. Potts told of the credit bureau which the Texas Sand and Gravel Association has within itself.

A resolution was passed by the directors to consider the subject and J. L. Shiely asked that a committee of three be appointed to collect information on the working of credit bureaus and distribute this to the membership. His motion was also carried.

Standardization of Sizes

Stanton Walker, director of the engineering and research of the association, reported that the work of the committee on standardization of sizes of gravel and sand was progressing steadily. A ballot on the recommendations of the committee representing about 40% of the membership and 60% of the tonnage had been received to date. For acceptance it is mandatory that the vote represent 80% of the tonnage.

He said that some misconception of the scope and effect of the committee's work had arisen from the action of John G. Carpenter, secretary of the Empire State Sand and Gravel Association, who thought six sizes of gravel too many. It had never been supposed by the committee that any individual company would make all six sizes, the standards for six being set up in order to cover the whole range of sizes made throughout the country, for which there were many more than six standards now in use. Mr. Carpenter had circularized the membership and several members had written to the committee for explanation. The committee did not recommend that any company should make more sizes than were needed for its market, its purpose being to confine the whole number of sizes to a few standards rather than to increase them.

Uniform Cost Accounting

The committee on uniform cost accounting reported through its chairman, H. H. Stewart, that a meeting had been held at Washington. It was decided that the industry as a whole needed (1) better bookkeeping systems, (2) knowledge that prices are built on cost and (3) study of cost systems. It concluded that simplicity should be the keynote of any system recommended, but the system should be elastic enough to permit cost-keeping in some detail where that was desirable. There should be a similarity in processes dealing with the same items of cost and the same principle should be used for classifying costs.

A questionnaire asked members if they kept cost systems. To this 48 said they kept costs in full, 5 that they kept part costs and 2 that they kept no costs. A second question asked if members favored a uniform system and 56 said they did, while 2 said they did not. Seventy-eight sent in samples of the cost methods used and from a study of these it was seen that there must be a classification of operations, the methods and equipment used varied so much.

J. R. Thoenen, of the U. S. Bureau of Mines, had proposed that the association issue a cost manual. The committee had examined the manuals of other industries, especially the laundrymen's manual and the Portland Cement Association's manual. The first was altogether too involved, and while the cement manufacturers' cost manual was much simpler it was still more detailed than was necessary for the sand and gravel industry. The committee planned to hold another meeting in July and expected to have something concrete to offer the association after that meeting.

Safety Committee's Report

In the report of the safety committee, V. O. Johnston, the chairman, pointed out that one company would have received a prize except for a technicality. The committee thought that there should be some method by which merit in safety work should be acknowledged where a prize or the trophy could not be awarded and suggested the awarding of a certificate. President Potts thought that since Rock Products had introduced the safety contest and borne the expense and awarded the trophy, it should also award the certificate. N. C. Rockwood, who was present, said that Rock Products would be glad to arrange to award such certificates.

Mr. Johnston said that the committee recognized that while humanitarian considerations were important in safety work, the business view was the improved efficiency that came from preventing accidents and that this was reflected in lower compensation insurance rates. For this reason the committee wanted to get the rates paid for compensation insurance through the Washington office in order to study them and to see how much they could be lowered and asked the co-operation of members to this end.

The Bureau of Mines report, "The Sand and Gravel Safety Contest of 1929," by W. W. Adams, was passed to the members of the board. (This was published in full in Rock Products, April 26.)

Twenty-six plants entered the contest last year and 77 are entered this year. The limitations of last year's contest are removed so that any plant of any size can compete.

Gravel Ballast

In discussing the work of the ballast committee, Stanton Walker reviewed the history of the attempt to secure a standard specification and referred to the present tentative specification. Briefly, this has a 1½-in. top limit and a No. 10 screen bottom limit. The amount of fines varies inversely with the amount of crushed material, as fines are necessary for stability with rounded pebbles but not with crushed pieces.

Some producers have asked that the top limit might be raised to 2 in. as this would save making a product differing widely from the usual concrete aggregate. In some cases such a specification has been agreed

upon by individual producers and individual railroads.

The American Railway Engineering Association, Iowa State College and the association are co-operating in a study of actual service of gravel ballast. The laboratories of the association and the Iowa college are making tests of materials and these are being compared with the actual service obtained from the same materials. This work will be of great value to the industry in developing specifications. The association's laboratory is developing methods of measuring stability, and the shrinkage of ballast of different types is being studied. It was encouraging to find so much attention given to gravel as ballast and to recognize how much its standing had improved.

The Industry and the Census

When the census bureau first made arrangements for the 1930 census the existence of the sand and gravel industry was not even recognized. The association impressed the importance of the industry on the census bureau and to avoid complications the industry was placed in the "mining" classification, although it is acknowledged to be more of a manufacturing than a mining industry. A special form has been prepared for it and the census will be taken by mail.

V. P. Ahearn explained this and said that a representative of the census bureau, who was to have been present, had been prevented from attending by illness.

J. R. Thoenen who helped to make the arrangement with the census bureau said that letters would follow the blank if it was not returned promptly, and that if the replies could not be readily made by mail the Bureau of Mines would send a man to aid in the work.

Mr. Thoenen was asked by President Potts to explain the new program of the Bureau of Mines, Department of Commerce, in regard to the nonmetallic mineral industries. Mr. Thoenen said that a new division had been formed to consider only nonmetallic operations and that he had been appointed as its head. In addition to collecting cost and operating data, this new division was having papers written by actual operators. Some of these will be read at the next annual convention and discussion will follow. This proposal was referred to the program committee.

The idea of the new division, Mr. Thoenen said, is to bring about a closer relationship between the Bureau of Mines and the operators so that the industry might benefit to a greater degree than it has before.

Work of the Engineering Division of the Association

Stanton Walker described briefly and informally some of the work of his division. A synopsis of places visited, papers published, contacts with other associations, and a general review of research work done and proposed was handed to the members. The work before other associations Mr. Walker thought an excellent method of getting publicity as such meetings were held in a number of cities and before a variety of engineers and others who would be interested. This year's field work is important because of the changes in design of highway concrete in some states, notably Illinois and Wisconsin.

Charles Stokes, material engineer of the Wisconsin Highway Department, present as a guest, followed Mr. Walker, saying that he felt certain that in the near future there would be nothing but strength specified for highway concrete, the contractor being allowed to choose his own design of mix and the materials used. Then the producer and contractor can get together and the most economical materials and methods used.

Mr. Walker gave a list of publications which were to be issued in permanent form with added data and some revision. The new Bulletin No. 5 is an example. He brought out that the engineering and research division's work was showing that limits placed on size, gradation and other characteristics were often lower than necessary. At present he thought the limit of maximum size was greater than it should be and in his opinion something on the order of 1½-in., or perhaps 1¾-in., would be the limit. There are many disadvantages in using larger sizes except in special work.

Additions to the staff of the engineering and research division have been made by authority of the executive committee. Baxter Smith has been engaged to assist in Washington and D. D. Maguire to act as district engineer at St. Louis.

Special work that is now going on included studies of gravel in bituminous construction and other low-cost roads, and the collection of information on the fire resistance of concrete containing quartz aggregates, which is now penalized by higher insurance rates. It was thought that no such temperatures as were used in testing were reached in ordinary fires. Methods of preventing segregation in aggregates is being studied. The tendency is to use separated sizes and the Bureau of Public Roads recommends this and may soon require it. This is nothing to be concerned about so long as the change does not come too fast. It may be a good thing in some sections, for one of the main reasons for too tight a limit on fines in gravel is the danger of segregation.

As to what had been brought out that was new he felt that he could say definitely that angular shape (not surface texture) had nothing to do with either the compressive or the flexural strength of concrete when properly comparable proportions are used. The effect of fine particles in sand, 50- to 100-mesh, is being studied. The thought has been advanced by certain engineers that many specifications are too low in the requirement for these sizes.

Cleaning and Repairing Cars

J. C. Buckbee reported that the committee on cleaning and repairing cars had finished its work, but the co-operation of members and their influence with the regional advisory boards of the railways is needed to get the results put into effect.

He described a new type of car, recently placed in service by the Chicago and Northwestern Ry., which seemed to him almost ideal, a steel gondola, 140,000 lb. capacity, built with a heavy steel underframe and a solid bottom covered with 3-in. plank. A clamshell cannot hurt such a car and it can hold 80 tons. The railroads had been glad to get the committee's survey of car requirements in order to know what the shippers really needed. He was glad to say that more hopper cars and solid bottom cars were being used and less of the drop-bottom type. The modern hopper car will unload 100% where the old types unloaded only 70% to 90%, the remainder being shoveled out.

Attendance

The following directors were present: President, R. J. Potts, Waco, Tex.; H. N. Battjes, Grand Rapids, Mich.; J. C. Buckbee, Chicago, Ill.; V. A. Cordes, Memphis, Tenn.; A. W. Dann, Pittsburgh, Penn.; H. M. Davison, Milwaukee, Wis.; H. S. Davison, Pittsburgh, Penn.; R. C. Fletcher, Des Moines, Ia.; Alex Foster, Jr., Philadelphia, Penn.; M. B. Garber, Lorain, Ohio; W. H. Gemmer, Houston, Tex.; Hugh Haddow, Jr., Millville, N. J.; V. O. Johnston, Lincoln, Ill.; H. V. Owens, Utica, N. Y.; F. W. Peck, Kansas City, Mo.; J. L. Shiely, St. Paul, Minn.; H. E. West, Muskogee, Okla.

Inland Lime and Stone Company to Have Electric Railway

CONTRACTS for the electrification of the new railway of the Inland Lime and Stone Co., Manistique, Mich., on the eight-mile line from the quarry to Seul Choix harbor, also the installation of electric lighting and telephone service for the entire operations, have been awarded to the Needham Electric Co. of Escanaba.

About twenty men will be employed in the work from May 15 to August 1, it was announced. William H. Needham, manager of the local company, said the common labor would be recruited from Schoolcraft county.

Trolley wires and other fixtures will be installed for the operation of the electric railway, which will be used for hauling quarry products to the docks, from where shipments will be made by boat to other Great Lakes ports. The Cliffs Power Co. will furnish the electric current for this electrically operated industry.

Construction activity is well under way in the Schoolcraft county project. Four contractors, employing about four hundred men altogether, are engaged in the dredging of the harbor and construction of docks, railway and quarry plants.—*Escanaba* (Mich.) *Press.*

Status of Foundry Sand Control as Seen by the Sand Producers*

By W. Worley Kerlin
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Abstract

THE three most important physical properties of a sand are venting factor, strength and temper. To keep these in proper proportions for molding and casting, tests of the heap sand are necessary. These properties, which make for stability in heap sand, are dependent to a large extent upon the qualities of new molding sand. A sand producer, therefore, must have information as to the chemical analysis, colloidal bond and screen analysis of his deposits. The methods available to the producer who seeks to control his shipments are outlined.

1. The object of routine sand testing of sand heaps is to express in precise terms the three physical properties that are the most important in the sand structure of a mold. This is the final stage in a program of sand control, which begins with the more fundamental work of finding the proper ingredients for making up the heap.

2. The properties most desired in a mold are (1) proper vent, (2) strength and (3) temper. The methods which measure these in terms of permeability, strength and moisture content have been described in other papers[1] and are well understood.

3. It is the purpose of this paper to tell something of the relationship between the properties of new sand and of its effect on the heap, and to indicate how far heap sand can be controlled by proper regulation of the raw materials entering the heap.

Heap Sand Control Important

4. Since the prepared heap is nearest in point of processing to the most crucial point in the manufacture of a casting—namely, the molding and pouring operations—the regular testing of the heaps aids in their final conditioning. These tests must be made rapidly in order to detect any irregularity before the mold is poured.

5. From his knowledge of properties of raw materials, the sand tester knows about what to expect from his heaps at this stage. By the regular addition of a given sand he knows what permeability to expect.

6. This permeability is seldom that of the raw sand, but the ratio between the new and the used condition is fairly definite. Certain sands may increase the strength and firmness of the mold without raising bond content or without decreasing permeability.

7. This faculty abides in the grain structure of the sand. It is this property which brings out the full effect of surface tension on strength when the sand is tempered in this instance. This is just one example of how the structure of molding sand may affect the final properties of the heap.

Laboratory Check of Raw Materials—Important Properties

8. The properties which make for stability in sand heaps are found in the nature of the new molding sand used. Grading and chemical analysis will describe these properties most accurately. It is in these primary laboratory tests that the explanation for most of the properties of permeability lies.

9. The tests involved here include:

1. Chemical analysis.
2. Colloidal bond.
3. Screen analysis.

10. A fourth property is grain shape, which can only be described in such general terms as "rounded," "angular" and "sub-angular."

Chemical Analysis

11. Chemical analysis is most useful when molding sand is considered as a mechanical mixture of sand grains and bond. These two constituents should be separated making actual chemical analysis.

12. Two definite chemical compounds can then serve as guides to the properties of the sand. One compound is pure silica—this is the ideal which the grain residue will approach as its heat resistance increases. The other compound is pure kaolin, which has the following composition:

	Per Cent
Silica (SiO_2)	46
Alumina (Al_2O_3)	39
Combined water (H_2O)	15

13. Kaolin is the main constituent of the colloidal bond in a molding sand. The different proportions in which these three compounds occur in the clay matter indicate the heat resistance and the efficiency of the bond. Burning-out in a molding sand involves the destruction of this compound through dehydration. Dehydration begins at 300 deg. F. and proceeds in varying stages of completeness up to 1200 deg. F.

Dehydration Test

14. Since these temperatures are much lower than the fusion temperature of either clay or silica, it suggests a test which is liable to contain more information about the heat resistance of a molding sand than would the actual fusion temperature of the whole sand.

15. Presence of impurities affects the heat resistance of sand. Lime lowers the fusion point of the grain or bond. Iron oxide has an effect similar to that of lime.

16. The presence of this impurity is not altogether bad, as Brown and DeWitt[2] have shown in their study of the effect of a film of hydrated iron oxide on sand grains in natural molding sand. They have shown by strength tests that this film increases the efficiency of bond.

Bond or Strength

17. The second property in which the producer is interested is bond. As the standard method for determining bond (recommended by the A. F. A. Committee on Molding Sand Research) becomes more widely used, it becomes easier to compare sands from various sources of supply with one another.

18. The old volume test is useful in comparing the bond content of sand with similar grain distribution, but this method fails as a means of comparison in most other cases. The percentage shown in a volume test is influenced by the extent to which the grain residue will pack when vibrated, as well as by the amount of colloidal bond in the sand.

19. The most direct effect of bond is on the strength of the sand. Amount of bond also has a direct bearing on the tempering range of the sand—the higher the bond content, the more moisture will be required to bring out the full extent of this bond.

20. The producer can be of service to

*Paper read at annual convention of the American Foundrymen's Association, Cleveland, Ohio, May 13.

[1]Standard and Tentatively Adopted Methods of Testing and Grading Foundry Sands, American Foundrymen's Association, July, 1928.

[2]Transactions, A. F. A., vol. 36 (1928), p. 247.

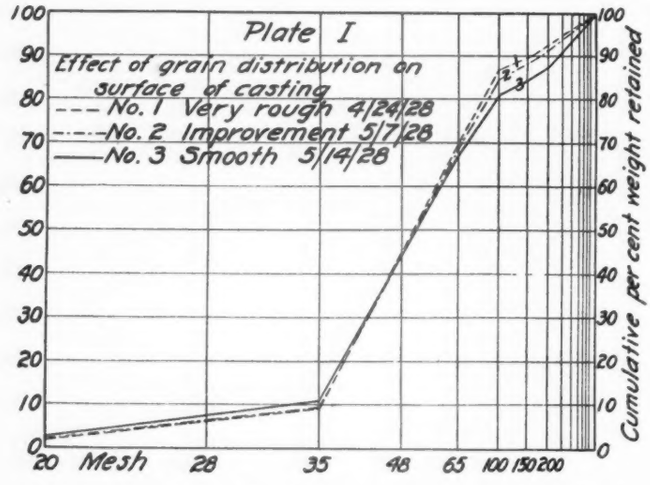


Fig. 1. Cumulative direct diagram of screen analysis on samples of heap sands for boiler sections, taken on Tyler standard screen scale, at screen scale ratio 1.414. Analysis shows following data:

Mesh size	—Sample No. 1— Per cent	Per cent cumulative weights	—Sample No. 2— Per cent	Per cent cumulative weights	—Sample No. 3— Per cent	Per cent cumulative weights
No. 10	0.7	0.7	0.2	0.2	0.8	0.8
20	1.4	2.1	2.0	2.2	1.5	2.3
35	7.3	9.4	7.6	9.8	8.6	10.9
65	60.8	70.2	59.9	69.7	56.6	67.5
100	16.2	86.4	15.3	85.0	13.6	81.1
150	3.2	89.6	3.2	88.2	3.1	84.2
200	2.6	92.2	3.1	91.3	3.1	87.3
200	7.8	100.0	8.7	100.0	12.7	100.0
Total	100.0		100.0		100.0	
Permeability	46.0		45.0		52.0	
Moisture, per cent	5.7		6.0		5.9	
Bond, per cent	9.8		10.5		9.2	
Strength, lb.	1.4		1.7		1.4	

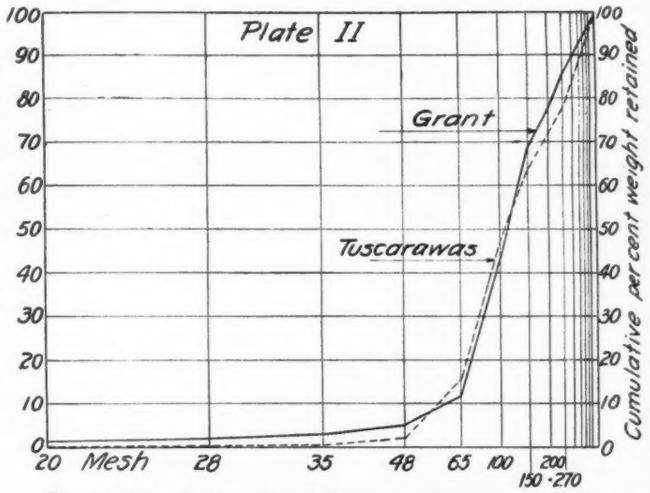


Fig. 2. Cumulative direct diagram of screen analysis on samples of new molding sands (Grant and Tuscarawas), taken on Tyler standard screen scale, at screen scale ratio 1.414. Analysis shows following data:

Mesh size	—Grant sand— Per cent	Per cent cumulative weights	Tuscarawas sand Per cent	Per cent cumulative weights
No. 10	0.3	0.3	....	....
14	0.6	0.9	1.1	1.1
20	0.6	1.5	....	....
28	0.8	2.3	0.1	0.2
35	1.0	3.3	0.2	0.4
48	2.4	5.7	2.0	2.4
65	6.5	12.2	13.3	15.7
100	33.0	45.2	31.6	47.3
150	24.5	69.6	16.7	64.0
200	9.0	78.6	8.6	72.6
270	7.3	85.9	5.8	78.4
Pan	14.1	100.0	21.6	100.0
Total	100.0		100.0	
Permeability, per cent	26.0		55.0	
Moisture, per cent	8.0		12.5	
Bond, per cent	17.4		17.9	
Strength, lb.	1.8		1.2	
Fineness	123.0		135.0	

the foundryman by supplying sand with constant bond content and of uniform grain distribution. Then every time the sand is tempered up to a certain "feel" of wetness to the hand, a check of moisture content will show it to be within specified limits. This is especially important on continuous units where sand is tempered on belts by a man who regulates the water additions by the "feel" of the tempered sand.

21. When the grain structure and bond content of sand are held constant from day to day, this operator can regulate his tempering more accurately. However, this can only be done by regular additions of a new sand of uniform properties.

22. Because of the time required to wash out the bond, it is not always convenient for the laboratory to check bond content as a regular procedure. Moreover, percentage of bond does not tell the whole story, since the base grain distribution has just as important an effect on the tempering range.

23. This difficulty is best overcome by specifying a sand with a maximum permeability which comes within a certain moisture range. This moisture range will not be the same as the desired moisture content of the heaps, but it will bear a definite relationship to it. A little investigation along these lines will provide a rapid method of checking every carload of sand purchased as to its combined properties of bond content and grain distribution.

Screen Analysis

24. Final step in the examination of a molding sand is the screen analysis of the grain residue after the bond has been washed out. This is a subject for basic sand research in the foundry, but it may be mentioned here as a means of getting the fineness number.[3]

25. The results from this screen analysis may be plotted cumulatively on the Tyler standard screen scale shown in Fig. 1. The screens for this analysis are chosen from those recommended by the Committee on Grading of the A. F. A. Committee on Molding Sand Research, with mesh areas decreasing in the ratio of 2 to 1 for each successive screen. This gives a curve which is easily understood and which presents a reliable picture of the grain distribution of the sand.

26. The grain distribution of a molding sand is responsible for many of its properties. A screen analysis explains many properties which are not revealed in the regular routine testing.

[3]Transactions, A. F. A., vol. 36 (1928), p. 707.

Research as Basis for Selecting Sand

27. When new sands are examined in the laboratory, it is important to be able to foretell to what extent physical properties will change as they are transformed into heap sand. Changes in permeability and strength are not due entirely to burning-out of bond, nor to the addition of auxiliary agents such as sea coal.

28. The efficiency of a sand cannot be exactly known until it is thoroughly incorporated in the heap, because of changes in grain structure caused by working of the heap. Any raw sand consists of glomerates of a number of grains with bond. Hence the true effect of individual grains on the whole is not known until these glomerates are broken up and the material distributed by the working of the heap. Tests which resolve the sand into its chemical or physical elements will remain constant during this transformation.

Grain Residue and Grain Shape

29. From the producer's standpoint, chemical analysis of the grain residue will often determine the locality from which the sand should be taken. For example, sand formed from the decomposition of rock in a sandstone region will have a different composition from that of

a deposit formed by glacial action in a shale district.

30. Shape of the grain also helps to determine location of the deposit when one considers the geological processes by which the grains are formed. The rounded grain of a river sand could hardly be expected to be duplicated by a rock-crushing process.

31. When the relation of all the basic elements to the whole is understood, most of these chemical and physical differences can be equalized. It is by balancing these elements that the producer is able to obtain the actual physical properties specified by the foundryman.

32. Take, for instance, the consideration of strength. Factors influencing this property are:

1. Chemical composition of the bond.
2. Amount of bond.
3. Shape of the grain.
4. Grain distribution.

Amount of Bond

33. Chemical composition and the shape of the grain are more or less fixed by the geology of the section in which the sand is found, although colloidal nature of the bond may vary greatly between pits of the same region. The amount of bond is under control in any sand-blending operation, however, and for this reason the producer considers his bond sand a raw material.

34. The percentage of bond is generally the first consideration when a given strength is specified. A general rule for estimating bond content required in a new sand is to figure on the new sand being from 2% to 5% higher in bond than the final result desired in the heap. In order to get a final check on the efficiency of the sand, it is desirable to follow through the effect of this bond content on the strength of the heap sand even after it gets into use.

Grain Distribution

35. The bond sand used in blending consists of colloidal bond and a grain residue. Therefore the addition of a bond sand to sand of lower bond content modifies the grain structure of the final product.

36. This is the fourth factor which determines the strength of the sand. Its influence on strength is shown by its bearing on the tempering properties of the sand. It was pointed out in a paper before the Pittsburgh Foundrymen's Association[4] that this was very important in regulating most of the physical properties of molding sand. It is here that the producer can be of greatest service to the foundryman.

Comparison of Grain Structures

37. Screen analysis and grain distribution are subjects for basic sand research in the foundry. For any class of casting a grain distribution can be found which gives best results.

38. When the screen analysis is plotted cumulatively on the Tyler screen scale, the grain structure of a heap giving good results can be compared with heaps giving inferior results. Such curves are shown in Fig. 2. This method will usually result in the construction of an ideal curve which can be used as a basis of studying sands from various sources.

39. When a sand is selected which comes within the grain-size limits desired, and which contains the amount of bond necessary for keeping up the strength of the heaps, the problem of sand control is greatly simplified. The sand control man will then be concerned with checking up shipments of new sand and supervising the regular additions daily.

40. One or two sands, carefully chosen, can serve the needs of a foundry producing a wide variety of castings. The advantage of using one sand in a continuous sand-handling system can readily be seen.

Permeability Control

41. In addition to having direct control of strength, the producer controls permeability by properly blending his sands. The most obvious relationship between fineness and permeability, and a general rule which may be followed in regulating permeability, is this: The greater the fineness number, the less the permeability —assuming that the bond content remains constant.

42. This is not always the case, however, as is readily illustrated in Fig. 2. It will be noticed in this case that the sand with the larger fineness number has over twice the permeability of the coarser sand. Since bond content is about the same in both sands, the difference in permeability can be attributed primarily to difference in the grain distribution of the sand. In spite of fineness, these sands would not serve the same purpose.

43. When one obtains wide differences in permeability within such a narrow fineness range as is shown in Fig. 2, the remedy usually lies in manipulation of the tempering range of the sand. The maximum permeability of the Tuscarawas sand comes at 12.5% moisture, while the maximum permeability of the Grant sand is at 8% moisture. The more uniform grain distribution of the former is denoted by the uniform rise in the curve over the greater part of its length.

44. This difference in grain distribution is probably responsible for retaining more moisture—the surface tension of the film prevents a reduction in strength. Difference in grain shape will also have some effect on permeability, as it probably did to some extent in this example; but tempering qualities are influenced mostly by grain distribution and bond content.

Sand Control by Producer

45. The facts obtained by basic sand research can best be applied toward sand control by the producer. Familiarity with the sand in his various pits, a knowledge of the effects produced by various combinations and blends, and records of tests and shipments enable a producer to give the foundryman invaluable assistance in his sand control problems.

[4]Kerlin, W. W.: "Screen Analysis Determines Distribution of Sand Grains," *The Foundry*, vol. 58, no. 2, Jan. 15, 1930, pp. 78-80.

Production of Asbestos in 1929

THE TOTAL QUANTITY of asbestos sold or used by producers in the United States in 1929 was 3155 short tons, valued at $351,004, according to figures compiled by the United States Bureau of Mines, Department of Commerce, from individual reports furnished by producers. These figures represent 1983 short tons of chrysotile, valued at $317,584, mined in Arizona and Vermont, and 1172 tons of amphibole, valued at $33,420, mined in Georgia, Maryland, Montana and North Carolina. As compared with 1928, figures for chrysotile showed an increase in quantity, but a decrease in value, while amphibole showed increases in both.

Figures for chrysotile include both crude and mill fiber and therefore represent a combination of high-grade and low-grade fiber. Amphibole is also produced as long and short fiber. To avoid disclosing confidential returns, the figures showing the high-grade long fiber from Maryland, used since 1918 for making chemical filters, have been combined with those showing mass and short fiber anthophyllite (amphibole) produced in Georgia, Montana and North Carolina.

In Arizona the average values for total crude asbestos (Nos. 1, 2 and 3) was about $300, ranging from $450 to $600 a ton for No. 1, from $225 to $500 a ton for No. 2 and from $75 to $275 a ton for No. 3. The average value for all mill fiber asbestos sold in Arizona (Nos. 1, 2 and 3) was $171.

Production was reported from Vermont for the first time since 1922, when experimental operations were carried on by the Asbestos Corporation of America. In 1923 activities were suspended at the property, which is in Lamoille county, near Hyde Park. Since that time the company has been reorganized under the name of the Vermont Asbestos Corp., operations resumed and a total of 1049 tons of mill fiber asbestos, valued at $47,799, reported for 1929.

The figures on asbestos sold or used by producers in Georgia, Maryland and North Carolina were collected in co-operation with the state geological surveys.

Imports of unmanufactured asbestos for consumption amounted in 1929 to 262,427 short tons, valued at $11,153,017, divided as follows: Crude, 16,976 tons; mill fiber, 95,384 tons; refuse, 150,067 tons. Corresponding total figures for 1928 were 230,595 short tons, valued at $9,017,891. Exports in 1929 were 709 short tons of crude, valued at $105,467.

Portland Cement Output in April

Slight Decrease in Production—Very Slight Increase in Shipments

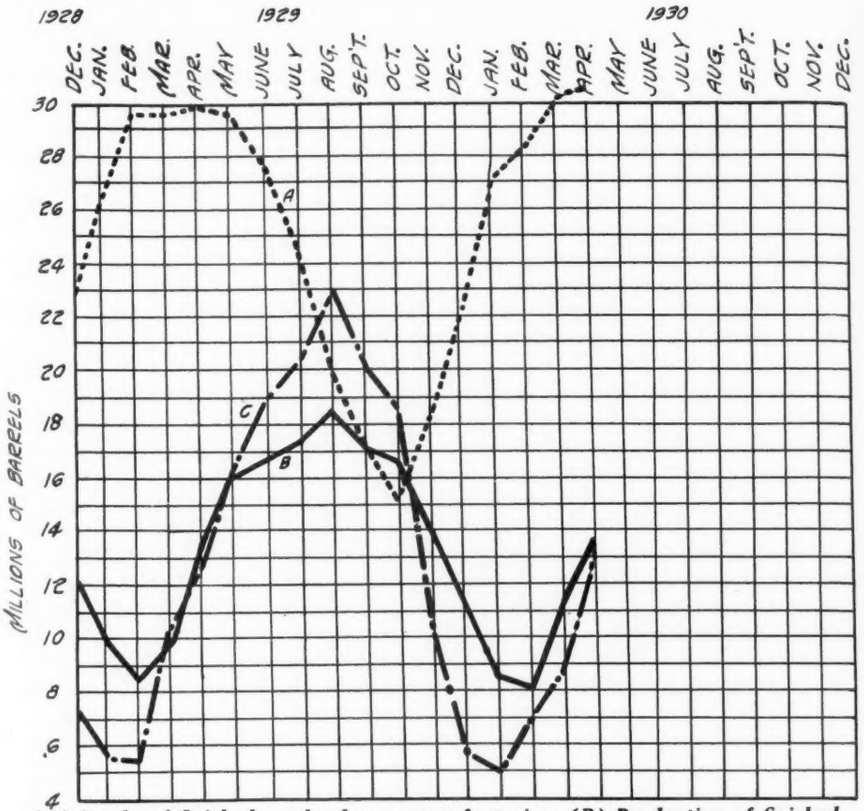
THE PORTLAND CEMENT INDUSTRY in April, 1930, produced 13,521,000 bbl., shipped 13,387,000 bbl. from the mills and had in stock at the end of the month 30,697,000 bbl., according to the United States Bureau of Mines, Department of Commerce. The production of portland cement in April, 1930, showed a decrease of 1.7% and shipments an increase of 0.5% as compared with April, 1929. Portland cement stocks at the mills were 1.8% higher than a year ago.

The statistics here presented are compiled from reports for April from all manufacturing plants except two for which estimates have been included in lieu of actual returns.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 165 plants at the close of April, 1930, and of 159 plants at the close of April, 1929. In addition to the capacity of the new plants which began operating during the 12 months ended April 30, 1930, the estimates include increased capacity due to extensions and improvements at old plants during the period.

RELATION OF PRODUCTION TO CAPACITY

	Apr. 1929 Pct.	Apr. 1930 Pct.	Mar. 1930 Pct.	Feb. 1930 Pct.	Jan. 1930 Pct.
The month	67.1	64.0	51.5	41.5	38.8
12 months ended	71.1	66.0	66.1	65.6	65.5



(A) Stocks of finished portland cement at factories; (B) Production of finished portland cement; (C) Shipments of finished portland cement from factories

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during February and March, 1929 and 1930:

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN FEBRUARY AND MARCH, 1929 AND 1930, IN BARRELS*

Shipped to	1929—February	1930	1929—March	1930
Alabama	105,162	135,425	127,916	104,750
Alaska	0	132	525	864
Arizona	58,844	35,218	57,406	44,917
Arkansas	40,599	80,512	93,133	86,481
California	900,811	696,999	1,063,895	720,008
Colorado	25,474	43,570	59,854	57,317
Connecticut	54,574	60,197	106,492	109,085
Delaware	14,459	16,100	19,112	19,467
District of Columbia	58,207	48,482	86,492	70,893
Florida	92,217	82,931	100,388	87,400
Georgia	73,064	90,938	95,061	101,858
Hawaii	20,683	25,734	22,366	22,829
Idaho	3,792	9,943	20,842	18,305
Illinois	251,883	356,200	612,069	379,453
Indiana	87,506	189,599	251,934	201,551
Iowa	21,406	111,155	123,637	117,907
Kansas	56,678	191,412	217,559	178,782
Kentucky	32,328	74,974	102,241	72,496
Louisiana	81,109	285,398	104,285	285,435
Maine	15,199	14,370	19,229	33,975
Maryland	59,087	101,896	131,729	172,822
Massachusetts	79,633	89,617	165,380	191,190
Michigan	273,538	258,450	474,902	344,412
Minnesota	44,013	111,059	136,193	91,055
Mississippi	50,254	48,264	75,353	56,606
Missouri	109,614	244,403	342,697	264,930
Montana	5,570	12,497	20,068	18,316
Nebraska	15,409	71,051	88,438	83,042
Nevada	6,905	8,306	9,755	11,923
New Hampshire	17,091	9,612	32,824	19,963
New Jersey	247,004	252,624	485,067	456,109
New Mexico	16,549	16,490	25,796	23,641
New York	667,767	663,031	1,285,742	1,095,851
North Carolina	85,373	75,768	159,570	101,751
North Dakota	2,502	10,070	16,912	20,791
Ohio	253,420	403,404	564,820	425,559
Oklahoma	112,301	234,569	318,321	283,365
Oregon	34,873	67,025	80,134	101,258
Pennsylvania	373,929	488,412	†716,114	700,470
Porto Rico	3,745	1,750	420	2,125
Rhode Island	25,497	18,256	43,300	45,477
South Carolina	74,035	49,865	100,091	62,241
South Dakota	4,361	31,133	32,110	28,448
Tennessee	80,026	110,578	140,815	143,103
Texas	424,778	508,921	621,387	618,703
Utah	11,850	21,954	28,712	40,937
Vermont	14,066	14,964	24,984	23,132
Virginia	83,678	97,003	138,772	120,043
Washington	68,792	124,926	214,280	214,098
West Virginia	35,675	62,589	70,720	75,381
Wisconsin	74,696	140,053	197,738	159,096
Wyoming	3,818	6,225	7,672	9,934
Unspecified	47,710	17,732	†28,531	119,408
	5,401,554	6,921,786	10,063,783	8,838,953
Foreign countries	46,446	90,214	49,217	66,047
Total shipped from cement plants	5,448,000	7,012,000	10,113,000	8,905,000

*Includes estimated distribution of shipments from three plants in February and March, 1929; from two plants in February and March, 1930.
†Revised.

PRODUCTION AND STOCKS OF CLINKER BY MONTHS, IN 1929 AND 1930, IN BARRELS

Month	1929—Production	1930	Stock at end of month 1929	1930
January	12,012,000	10,504,000	9,642,000	9,646,000
February	11,255,000	10,008,000	12,436,000	11,572,000
March	12,450,000	13,045,000	14,948,000	*13,503,000
April	14,166,000	15,025,000	15,479,000	15,115,000
May	15,444,000		14,911,000	
June	15,312,000		13,587,000	
July	15,214,000		11,619,000	
August	15,829,000		8,995,000	
September	15,165,000		7,009,000	
October	15,515,000		5,934,000	
November	14,087,000		6,134,000	
December	12,539,000		7,526,000	

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN APRIL 1929 AND 1930, AND STOCKS IN MARCH, 1930, IN BARRELS

District	Production 1929—April—1930		Shipments 1929—April—1930		Stocks at end of month 1929	1930	Stocks at end of Mar. 1930
Eastern Penn., N. J., Md.	3,005,000	3,067,000	3,164,000	3,155,000	6,781,000	6,941,000	7,028,000
New York	900,000	999,000	732,000	857,000	2,242,000	1,829,000	1,687,000
Ohio, West'n Penn., W. Va.	1,401,000	1,458,000	1,274,000	1,375,000	3,777,000	3,965,000	3,882,000
Michigan	964,000	562,000	897,000	702,000	2,659,000	2,595,000	2,734,000
Wis., Ill., Ind. and Ky.	1,903,000	1,366,000	1,608,000	1,265,000	4,343,000	4,679,000	4,578,000
Va., Tenn., Ala., Ga., Fla., La.	1,117,000	1,262,000	1,251,000	1,239,000	2,114,000	1,750,000	1,728,000
East'n Mo., Ia., Minn., S. D.	1,150,000	1,415,000	1,086,000	1,231,000	4,362,000	4,046,000	3,863,000
Western Mo., Nebr., Kans., Okla. and Ark.	953,000	1,160,000	1,034,000	1,265,000	1,416,000	1,836,000	1,940,000
Texas	622,000	757,000	625,000	775,000	443,000	825,000	845,000
Colo., Mont., Utah, Wyo., Ida.	307,000	286,000	266,000	262,000	492,000	542,000	517,000
California	1,085,000	838,000	1,058,000	921,000	921,000	1,104,000	1,187,000
Oregon and Washington	343,000	351,000	330,000	340,000	601,000	585,000	574,000
	13,750,000	13,521,000	13,325,000	13,387,000	30,151,000	30,697,000	30,563,000

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1929 AND 1930, IN BARRELS

Month	1929—Production—1930		1929—Shipments—1930		Stocks at end of month 1929	1930
January	9,881,000	8,498,000	5,707,000	4,955,000	26,797,000	27,081,000
February	8,522,000	8,162,000	5,448,000	7,012,000	29,870,000	*28,244,000
March	9,969,000	11,225,000	10,113,000	*8,905,000	29,724,000	30,563,000
April	13,750,000	13,521,000	13,325,000	13,387,000	30,151,000	30,697,000
May	16,151,000	.....	16,706,000	.....	29,624,000	.....
June	16,803,000	.....	18,949,000	.....	27,505,000	.....
July	17,315,000	.....	20,319,000	.....	24,525,000	.....
August	18,585,000	.....	23,052,000	.....	20,056,000	.....
September	17,223,000	.....	19,950,000	.....	17,325,000	.....
October	16,731,000	.....	18,695,000	.....	15,381,000	.....
November	14,053,000	.....	11,222,000	.....	18,213,000	.....
December	11,215,000	.....	5,951,000	.....	23,550,000	.....
	170,198,000	.....	169,437,000	.....	292,721,000	.....

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN APRIL, 1929 AND 1930, IN BARRELS

District	1929—Production—1930		Stocks at end of month 1929	1930
Eastern Pennsylvania, New Jersey and Maryland	3,100,000	3,264,000	2,648,000	2,461,000
New York	953,000	1,081,000	1,413,000	1,082,000
Ohio, Western Pennsylvania and West Virginia	1,394,000	1,640,000	1,790,000	1,845,000
Michigan	1,122,000	907,000	1,521,000	2,053,000
Wisconsin, Illinois, Indiana and Kentucky	1,890,000	1,829,000	2,470,000	2,482,000
Virginia, Tennessee, Alabama, Georgia, Florida, Louisiana	1,045,000	1,335,000	1,358,000	964,000
Eastern Missouri, Iowa, Minnesota and South Dakota	1,234,000	1,547,000	1,199,000	1,158,000
West'n Missouri, Nebraska, Kansas, Oklahoma Arkansas	929,000	1,199,000	774,000	519,000
Texas	613,000	643,000	216,000	404,000
Colorado, Montana, Utah, Wyoming and Idaho	343,000	234,000	573,000	183,000
California	1,119,000	946,000	1,004,000	1,356,000
Oregon and Washington	424,000	400,000	513,000	608,000
	14,166,000	15,025,000	15,479,000	15,115,000

Exports and Imports

These figures were compiled from the records of the Bureau of Foreign and Domestic Commerce and are subject to revision.

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN MARCH, 1930

Exported to	Barrels	Value
Canada	2,539	$11,731
Central America	62,785	173,329
Cuba	7,168	17,372
Other West Indies and Bermuda	4,349	13,196
Mexico	15,207	39,743
South America	21,893	81,259
Other countries	3,622	21,266
	117,563	$357,896

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN MARCH, 1930

Imports from	District into which imported	Barrels	Value
Belgium	Massachusetts	24,946	$33,463
Canada	Maine and N. H.	5	14
Denmark	Porto Rico	4,375	5,548
United Kingdom	New York	14,296	20,956
		43,622	$59,981

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA HAWAII AND PORTO RICO IN MARCH, 1930

	Barrels	Value
Alaska	708	$2,244
Hawaii	18,385	46,311
Porto Rico	4,605	9,478
	23,698	$58,033

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1929 AND 1930

Month	1929—Exports—1930 Barrels	Value	Barrels	Value	1929—Imports—1930 Barrels	Value	Barrels	Value
January	78,639	$283,002	82,387	$293,135	151,302	$177,976	201,609	$207,461
February	58,886	225,590	64,267	217,798	118,930	123,123	114,455	119,717
March	69,079	235,164	117,563	357,896	131,909	112,788	43,622	59,981
April	64,145	218,316	.....	.....	89,668	114,281	.....	.....
May	57,955	219,366	.....	.....	200,646	267,854	.....	.....
June	96,055	287,612	.....	.....	203,545	228,170	.....	.....
July	71,992	247,177	.....	.....	182,098	199,960	.....	.....
August	60,013	225,762	.....	.....	183,938	199,403	.....	.....
September	86,268	308,631	.....	.....	112,372	152,239	.....	.....
October	101,359	337,839	.....	.....	172,566	187,504	.....	.....
November	53,378	198,197	.....	.....	96,568	95,844	.....	.....
December	88,403	297,255	.....	.....	84,358	79,098	.....	.....
	886,172	$3,083,911	.....	.....	1,727,900	$1,938,240	.....	.....

Texas Cement Output

DURING March, Texas cement mills turned out 694,000 barrels of cement, against 482,000 barrels in February and 527,000 barrels in March, 1929. Production in the first quarter totaled 1,497,000, a new high record for the state. Two more mills were operating in the first three months than in any previous year, which makes this year's record less optimistic.

Shipments amounted to 627,000 barrels in March and 1,465,000 barrels in the first quarter. This compares with 594,000 barrels in March and 1,469,000 in the first three months of 1929. Shipments so far this year have not kept pace with production. Stocks on April 1 totaled 845,000 barrels, against 778,000 barrels a month earlier and 446,000 barrels on April 1 a year ago.

The basic price on April 1, delivered, was $2.20 in Dallas and $2.30 in Houston.—*Wall Street Journal.*

South Carolina Reported Ready to Evade Paying Duty on Imported Cement

THE South Carolina highway department plans a legal course to save the cement bought for the state's highway program from the recently enacted Republican tariff. C. E. Jones, chairman of the highway commission, outlined a plan whereby the highway department proposes to "buck" the tariff on cement.

The plan is to buy cement in Europe, ship it to American shores, and land it, not as an imported product of merchandise, but South Carolina owned property, and not subject to federal taxation. The proposed move is based on the contention that the federal constitution forbids the taxing by the federal government of any state-owned property. The cement would not be bought from American representatives of European cement manufacturers, but bought direct from the European manufacturers, in Europe. It would then become South Carolina property, and would not, it is contended, be subject to federal taxation at the border or after being brought across the border.—*Charlotte* (N. C.) *Observer.*

Fire Damages J. E. Baker Co. Lime Plant

FIRE which followed an explosion on May 8 destroyed the J. E. Baker Co. lime kiln at Billmeyer, Penn., and endangered the town itself until it was finally extinguished after four hours of work by firemen from four Lancaster county towns. The loss, estimated by owners, is $75,000.

Clifton Scott and Jacob Martin, lime inspectors, reported they were at work about 1 o'clock in the morning when an explosion occurred. The men were temporarily blinded by the resultant gas but managed to sound an alarm.

The unusually dry condition of the section converted the fire into a menace to the town until it was eventually extinguished.

Traffic on the Pennsylvania railroad between Columbia and Harrisburg was disrupted for three hours due to the concentration of fire apparatus about the scene.—*York* (Penn.) *Dispatch.*

Asphalt Rock Deposit Reported in Ohio

WHAT is believed to be one of the few deposits of rock asphalt in Ohio was found recently in a quarry at Rock Mills, seven miles south of Washington Court House, Ohio. The discovery followed the discharging of a quantity of dynamite.

The only other known deposit of rock asphalt in the state is said to exist at Hillsboro, in Highland county.

The deposit was 17 ft. beneath the surface of the earth and its extent has not been determined.—*Portsmouth* (Ohio) *Times.*

Aggregates for Airport Runways

AIRPORT RUNWAYS, according to a paper presented by Joseph A. Feely, presented at a meeting of the Engineers' Club at Philadelphia, must be: (1) Dustproof, for the safety of the flyers and the public; (2) waterproof so as not to be affected by undermining frost; (3) resilient to reduce the impact of planes in landing; (4) pliable, to allow the tail skids of landing planes to cut in slightly, thus contributing to the prevention of tail spinning in landing planes; (5) with rebinding qualities to reduce the cost of repairing the effect of tail skids.

Experiments with competitive materials and methods were made at Valley Stream, L. I., and the following method was worked out: The center of the area to be covered was raised 18 in. and graded uniformly in all directions to the edge. Over this 6 in. of sand was spread and carefully graded and then mixed in place by disc harrows and graders with an oil which has been specially developed for the work.

The paper says that too much emphasis cannot be laid on the necessity of correct gradation for the sand. The sand found best by experiment had the following gradation:

Passing 100-mesh	1.04%
Passing 65-mesh	8.13%
Passing 50-mesh	16.66%
Passing 30-mesh	62.28%
Passing 20-mesh	77.59%
Passing 10-mesh	93.22%
Passing ¼-in.	96.72%
Retained on ¼-in.	3.28%

It is most important, according to the paper, that the sand passing 100-mesh should not exceed 3%. Loam is especially objectionable, contributing to an over excess of binding materials with probable failure, or at least a greater maintenance charge.

The paper also describes the bituminous strips laid at the Central Airport, Camden-N. J., in which a different method was followed. A base course of 3 in. of cinders, compressed, was laid, followed by 3 in. of ½-in. slag. This was penetrated with asphalt and covered with 35 lb. per sq. yd. of ¾-in chips. After thorough rolling a seal coat of 30 lb. to the square yard of ¾-in. chips was applied. A special oil had finally to be developed to hold the chips so that they would not be lifted by the backwash of the propellers of the planes. When this occurred the chips often penetrated the fabric of the planes, damaging the rudders or other control parts and presenting a serious menace to pilots and the public. The application of the special heavy oil stopped this danger.

Highway Contracts Up

HIGHWAY CONTRACTS awarded during first quarter of 1930 in 35 states, encompassing 75% of the country, amounted to $114,101,383 against $50,910,133 for first three months of 1929, gain of 124%, states Secretary of Commerce R. P. Lamont.

Contracts let in Pennsylvania increased 577%, in New Hampshire 755%, Washington 650% and Colorado 455%.

Great increase in early season highway construction is a matter of considerable national importance, in opinion of Secretary Lamont. Improved highways represent a material contribution to stabilization of business conditions of the present and future, and the large volume of early awards may be especially significant in connection with the problem of spreading employment throughout the year, Mr. Lamont said.

April Building Contracts Lower

CONTRACTS AWARDED in April for building and engineering projects in the 37 states east of the Rocky Mountains, totaling $483,251,700, were larger than in any month since August of last year, according to the F. W. Dodge Corp. The past month's record was 6% greater than the total of $456,119,000 reported for March, but showed a loss of 25% from April, 1929. For the first four months of the year, awards totaled $1,580,398,900, as compared with $1,897,889,800 for the corresponding period of 1929, a decline of 17%.

Public works and utilities for the fourth consecutive month were the most important of all classes. This type of construction totaled $149,669,900, or 31% of the total awards in April. Residential building totaled $123,141,900, or 25%; commercial structures amounted to $73,241,100, or 15%, and industrial buildings aggregated $38,120,600, or 8%.

Contemplated new work of all kinds reported in April amounted to $954,617,400, compared with $732,735,900 in March and $940,249,100 for April, 1929.

Coal-Mine Fatalities

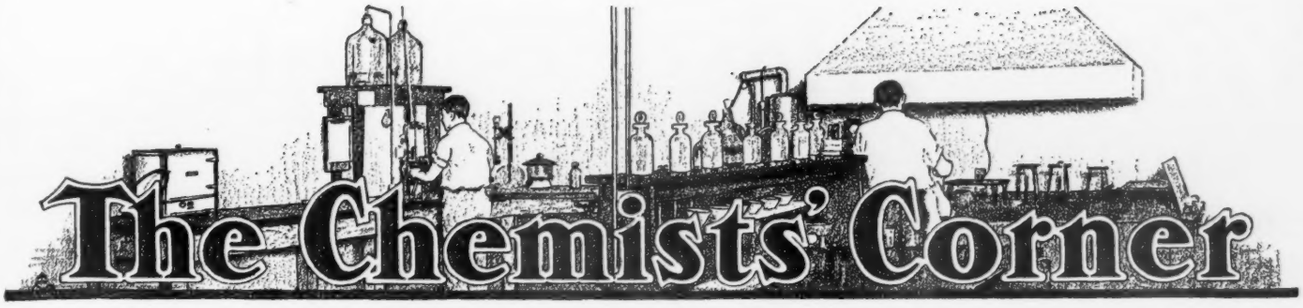
THE Bureau of Mines, U. S. Department of Commerce, has recently issued Bulletin 319, "Coal-Mine Fatalities in the United States in 1928," by William W. Adams. The booklet goes into exhaustive details and tables the fatalities by states, causes, and months. The principal causes of accidents are outlined and figures given of surveys of fatalities over the five-year and ten-year periods preceding 1928. The bulletin may be obtained by sending 20 cents in stamps to the Superintendent of Documents, Washington, D. C.

Retail Prices of Various Rock Products Materials

THE TABLE below gives average prices paid April 1, 1930, by contractors for various rock products, delivered on the job at different principal cities of the United States. These prices were secured through the Bureau of Census.

AVERAGE RETAIL PRICES FOR ROCK PRODUCTS MATERIALS, APRIL 1, 1930

City	MATERIAL					
	Portland cement, per bbl. excl. of cont.	Gypsum wallboard, ⅜-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾-in., per ton	Gypsum plaster, neat, per ton
New Haven, Conn.	$2.90	.....	$15.00	$1.50	$2.25	.....
New London, Conn.	2.80	$25.00	24.00	1.50	3.00	$18.00
Waterbury, Conn.	3.00	30.00	20.00	1.35	2.45	20.00
New Bedford, Mass.	2.80	25.00	23.00	1.75	3.00	17.50
Haverhill, Mass.	2.80	25.00	20.00	.....	.....	18.75
Poughkeepsie, N. Y.	2.04	.....	.....	2.25	2.20	.....
Albany, N. Y.	.....	24.75	18.00	.....	.....	17.10
Rochester, N. Y.	3.25	22.00	22.00	2.50	2.40	17.00
Syracuse, N. Y.	3.00	22.50	26.00	2.00	2.00	17.00
Buffalo, N. Y.	3.10	25.00	18.00	2.50	2.05	14.00
Yonkers, N. Y.	2.65	.....	17.00	2.25	3.25	17.00
Paterson, N. J.	2.80	26.00	18.00	1.50	2.10	17.50
Trenton, N. J.	2.40	26.00	18.00	1.50	2.10	17.50
Scranton, Penn.	2.80	.....	20.00	3.25	.....	19.00
Philadelphia, Penn.	2.30	.....	15.50	1.85	2.65	19.75
Harrisburg, Penn.	2.60	24.30	14.40	3.10	1.50	16.65
Baltimore, Md.	2.75	.....	13.00	2.00	2.75	16.00
Washington, D. C.	2.65	25.00	14.00	.....	.....	17.00
Richmond, Va.	3.10	31.00	17.50	1.95	2.45	20.00
Fairmount, W. Va.	2.80	35.00	16.00	3.15	3.50	18.00
Winston-Salem, N. C.	2.54	23.50	24.00	2.50	3.60	17.50
Columbia, S. C.	2.80	.....	.....	1.25	.....	17.50
Atlanta, Ga.	3.10	.....	21.00	3.04	3.25	20.00
Savannah, Ga.	2.25	25.00	20.00	2.00	5.50	16.00
Louisville, Ky.	2.52	.....	15.50	.....	2.43	16.00
Tampa, Fla.	$2.60	.....	$20.00	$2.00	$4.00	$20.00
Birmingham, Ala.	3.00	.....	20.00	3.00	2.50	.....
Erie, Penn.	2.40	$22.50	19.00	2.25	.....	16.00
Columbus, Ohio	2.75	23.00	17.50	2.25	2.50	15.00
Toledo, Ohio	.....	25.00	20.00	2.25	2.75	18.00
Cincinnati, Ohio	2.94	24.75	16.40	2.63	2.55	.....
Cleveland, Ohio	2.68	22.00	16.00	2.09	3.65	15.50
Youngstown, Ohio	2.95	.....	20.00	3.71	2.75	.....
Detroit, Mich.	2.60	21.00	14.80	2.75	3.00	.....
Terre Haute, Ind.	3.00	28.00	18.00	1.65	3.50	20.00
Chicago, Ill.	2.20	.....	17.00	1.75	1.90	15.00
Milwaukee, Wis.	2.60	25.00	.....	2.00	2.00	18.00
Lansing, Mich.	2.75	.....	22.00	2.25	2.25	16.00
Des Moines, Iowa	2.66	23.75	20.00	1.60	3.60	.....
St. Louis, Mo.	2.45	.....	18.00	2.70	1.90	17.00
Kansas City, Mo.	2.50	25.00	24.00	1.88	1.88	15.00
St. Paul, Minn.	2.60	25.00	21.00	1.40	2.00	16.00
Sioux Falls, S. D.	2.80	27.00	26.00	1.50	2.25	16.00
Denver, Colo.	3.20	.....	23.00	1.25	1.15	18.00
Grand Forks, N. D.	2.80	25.00	.....	2.60	.....	16.00
Houston, Texas	2.30	.....	21.50	1.75	3.50	18.00
Tucson, Ariz.	3.07	.....	30.00	1.25	2.25	19.00
Los Angeles, Calif.	1.72	34.00	24.00	1.00	1.30	17.50
San Francisco, Calif.	.....	.....	22.50	1.40	1.60	20.00
Seattle, Wash.	1.90	35.00	22.00	1.40	.....	20.00



Determination of Sucrose Soluble CaO in Portland Cement

By T. F. Sedgwick
Industrial Chemist, Honolulu, T. H.

MY RESULTS indicate that the method for determining the sucrose soluble CaO in burnt and hydrated lime, appears to give a fair index of the amount of free CaO in cements. I tested several samples of cements found here in the market. At the time of the analysis, they showed about 4% sucrose soluble CaO; after the sample remained in the air and the free lime had an opportunity to change to the carbonate, the amount of sucrose soluble CaO was 0.2% (which would include the alkalies contained in the cement). I am of the opinion that the magnesia and alkali contained in the cement would not materially affect the results.

I enclose a copy of the Bureau of Standards' method for determining the sucrose soluble CaO, and a copy of the method used by the Hawaiian Sugar Planters' Association. The American Lime Manufacturers' Association has also issued a method for the sucrose soluble CaO in burnt and hydrated lime.

In carrying out either method, care should be taken to prevent caking of the cement sample, either in the evaporating dish or flask. I used a modification of both the Bureau of Standards and the Hawaiian Sugar Planters' Association methods, which appears to give satisfactory results. The weighed sample of 5 grams is placed directly in the 200- or 250-cc. flask. During the slaking process in the flask, the contents of the flask are agitated to prevent the cement from caking—glass beads would facilitate this.

The aliquot part of the filtered solution taken for titration, is, of course, considerably greater than that for lime, and in estimating the percentage, this is to be taken into consideration.

(*Extract from circular of the Bureau of Standards No. 207, Issued April 1, 1925*)

SUGAR SOLUBLE LIME: If the material to be tested is quicklime, grind to pass a No. 100 sieve. Place a 5,000 g. sample in a 200-cc. flask with 75 to 90 cc. of freshly boiled distilled water. Boil gently for 3 minutes. Cool to room temperature. Add 40 to 45 g. of commercial white granulated sugar (sucrose) completely dissolved in 40 cc. of hot freshly boiled distilled water. Shake vigorously with a rotary motion of the flask, keeping the lime in suspension for 30 minutes. Fill to the mark, mix and filter, rejecting the first runnings. Pipette off 100 cc. of the filtrate and titrate with 1,785 normal nitric acid (1 cc. = 0.050 g. CaO), using phenolphthalein as indicator. The cubic centimeters of acid used, multiplied by 2, equals the percentage of sugar soluble lime in the sample as tested. Convert into per cent on nonvolatile basis.

(*Available CaO in lime—Method used by the H. S. P. A. Experiment Station*)

Weigh quickly 5 g. of the finely ground sample; transfer to a small cassarole containing 25 to 50 cc. of distilled water; boil to complete the slaking. Transfer to a 250-cc. flask containing 75 cc. of a 50 brix solution of a refined sugar and about 100 cc. distilled water, mixing rapidly. If this is quickly done, the lime will all go into solution at once. Fill to the mark, mix, filter and titrate 25 cc. of the filtrate (diluted to about 200 cc.) with standard N/2.8 acid*, using phenolphthalein as indicator. The number of cc. required multiplied by 2, equals the percentage of available CaO in the lime.

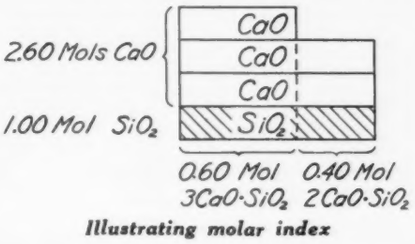
*The H. S. P. A. Experiment Station uses N/2.8 sulphuric acid.

Contributions to this department of ROCK PRODUCTS are especially solicited. Besides payment at space rates the contributors may receive prizes of $175—in time for Xmas.—The Editors.

Lime-Silica Index

By HAROLD H. STEINOUR
Riverside Cement Co., Riverside, Calif.

IN THE CHEMIST'S CORNER, March 29, 1930, G. W. Jordan emphasizes the advantages of the lime-silica index when calculated in accordance with the latest and most reliable data on clinker constitution, that recently published by the Portland Cement Association Fellowship at the Bureau of Standards.



Illustrating molar index

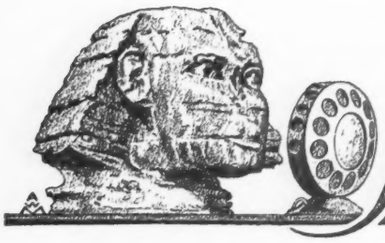
I quite agree with what Mr. Jordan has to say on this point and would like to call attention to the further advantages which arise when this index is made to show the molecular proportions of lime to silica. This change is accomplished simply by multiplying the lime-silica index by the factor 1.07, which is the ratio of the molecular weights of silica and lime. Such a Lime-Silica *Molar* Index was proposed by Shoichiro Nagai in the *Journal Society Chemical Industries* (Japan) **32** (3), 73B (1929).

The Lime-Silica *Molar* Index shows the number of mols of lime which are available to combine with each mol of silica. Since the only silicates to be considered are dicalcium silicate, $2CaO \cdot SiO_2$, and tricalcium silicate, $3CaO \cdot SiO_2$, if the molar index were 2.00, indicating two molecules of lime to one of silica, then $2CaO \cdot SiO_2$ would be the only silicate formed. If the molar index were 3.00, indicating three molecules of lime to one of silica, then when burned to equilibrium so that all of the lime were combined, only $3CaO \cdot SiO_2$ and no $2CaO \cdot SiO_2$ would result. If the index were above three, free lime would exist in the product.

In practice the molar index will ordinarily be between 2.00 and 3.00. For example, suppose it were 2.60. The fractional part of this index, the 0.60, would express the fraction of the silica that would combine as $3CaO \cdot SiO_2$ at equilibrium. This is evident from the accompanying diagram which is self-explanatory. It shows that this fraction, 0.60, would also be the fraction of the total mols of silicate which would exist as $3CaO \cdot SiO_2$

In applying the index to cements it is a simple matter to correct the lime for free lime and lime introduced by the gypsum. The fractional part of the index then denotes, on the molar basis, what fraction of the total silicate is actually present in the cement as tricalcium silicate.

It would seem that the slight extra work in preparing the indices occasioned by the introduction of the factor 1.07 would be well repaid by the ability to see at a glance the molar proportions of tri- and dicalcium silicate.



Hints and Helps for Superintendents

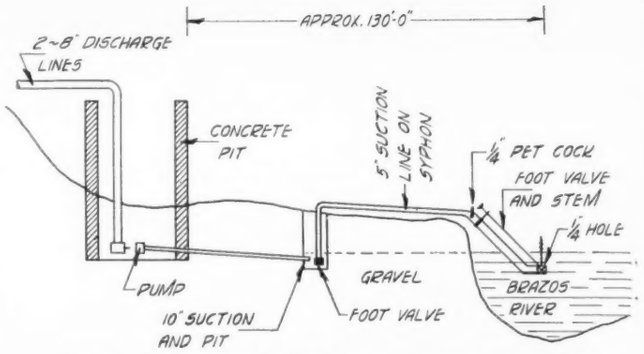
Increasing Water Supply of Gravel Operation

AT THE WASHING PLANT of the Potts-Moore Gravel Co., Waco, Tex., water is taken from two pits driven into gravel beds very close to the Brazos river, which flows past the deposit. When a normal amount of water is flowing in this river the pumping plant is back from the edge of the river, roughly 130 ft., but during flood stages the river has come within a few feet of the top of the concrete structure shown in the photograph. This structure extends downward so that its base is about on a level with the river at low stages.

Pumps set in the bottom of the concrete structure and are supplied water by a syphon

To get clean water from the river, two circular pits have been sunk to gravel about midway between the pumps and the river's edge at normal times, and a 10-in. suction line is connected to screened intakes of these pits and to the two 6-in. centrifugal pumps.

When the river is at a low stage there is not sufficient water flowing through the gravel to supply the pumps, so C. W. Crisler, general manager of the company, installed a 5-in. syphon from the river bed, as shown in the accompanying sketch. The syphon is provided with gate valves at the river end and at the discharge end, both valves being opened and closed by an extended handle that acts as a stem. The syphon is primed from a 2-in. line direct from the pump discharge. At the bend where the syphon goes into the river a pet cock has been installed to act as an air vent. Lastly, but not least in importance, is the fact that in the foot valve a ¼-in. hole has been bored, that remains open all the time and automatically drains the pipe line when it is not in use, so as to prevent freezing; and as the hole is of such small diameter, it does not interfere with the priming of the syphon.



Sketch showing method of increasing water supply at gravel washing plant

By this method plenty of water is always available to the pump and at a small fraction of the cost had it been necessary to build other intake pits and install more suction lines.

Plant Fire Protection

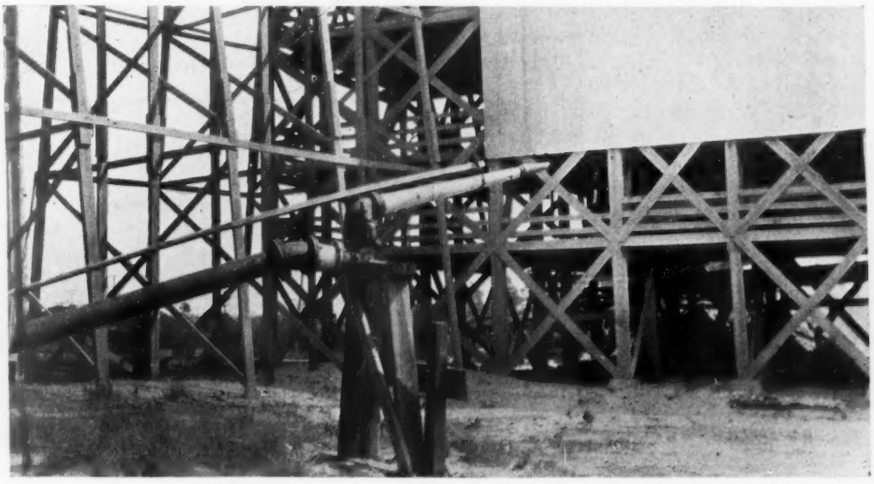
AT THE PLANT of the Camp Phosphate Co., near Dunnellon, Fla., the early operation used hydraulic methods for removing the overburden from the rock phosphate deposits. The operations are now called mining, but are in reality more in the nature of a quarry than of a mine.

For fire protection the management has mounted one of the old hydraulic "guns," as shown in the illustration, and connected it with the necessary pumps so that in the event of fire at the washing plant there is provided a really effective method of combating the flames.

We believe this method to be better than having a lot of hose and hardware cluttering the place, which when fire breaks out is apt to be so old and rotten that the hose will not stand the pressure necessary for effective fire control. With a rig of this kind it's always in place at a minute's notice to throw enough water to literally wash the plant away if need be. A fire insurance company should give a substantial reduction in the premiums to a plant supplied with a water supply in this fashion.

Slurry Sampler

THE DEVICE described herewith was designed for sampling a Dorr thickener in mining practice by a writer in *Engineering and Mining Journal*. Apparently it could

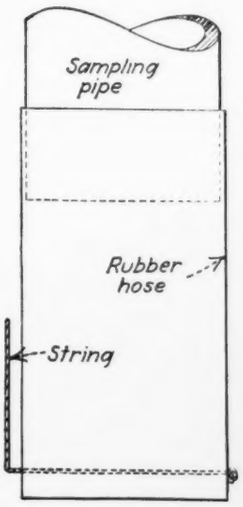


Rock phosphate plant uses hydraulic "gun" as fire protector

serve equally well for sampling cement slurry tanks.

The sample may be taken with a pipe, cutting out a complete section from the top to the bottom of the tank. The problem is, however, to find a simple and effective method of closing the pipe, so it can be lifted out of the tank without the loss of the sample. Mechanical devices are generally unhandy and difficult to keep in good working order, especially where corrosive solutions are dealt with. The accompanying illustration shows a simple arrangement for closing a pipe sampler:

A short piece of soft rubber tube is fastened to the end of the pipe, and a long and strong string attached to the rubber hose, through holes punched near its lower end. A pull exerted on the string causes the tube to bend, thereby closing the pipe. When taking a sample, the pipe is lowered into the tank, slowly enough to insure a good sample. As soon as the rubber hose touches the bottom the string is pulled tight, whereupon the pipe may be lifted out and emptied in a suitable container, after releasing the string. By combining samples taken from different sections, a representative sample may be obtained. The method allows sampling almost down to the bottom of a tank, which is not possible with a bottle sampler.



Slurry sampler

Screening "Fines" from Rip-Rap

THE HAUSER CONSTRUCTION CO., Long Beach, Calif., operates a rip-rap quarry near Riverside. The stone produced is used for the various harbor development projects on the southwest Pacific coast.

Under the old method of operating the quarry, by the use of coyote-hole blasting, a considerable amount of fines was produced. These fines were cast to one side, to be later reclaimed. This material contains an appreciable amount of stone in pieces weighing 25 lb. or more, which are suitable for core material in rip-rap work; and upwards of 100,000 tons of this stone has been reclaimed by an ingenious homemade screening device. This consists of a hinged horizontal grizzly spaced at 2½-in. centers, built over a short trough-like gallery, through which passes a Sauerman power scraper. The scraper pulls the fine rejects out over an overhanging extension of the trough-like gallery to the waste pile alongside. The screening device is mounted on skids to facilitate movement about the quarry.

One of the steam shovels puts the material on the grizzly, after which the grizzly is lifted to approximately a 45 deg. angle,

Screening device for reclaiming small rip rap from waste pile

Drag for removing fines from screening plant

allowing the oversize to slide into a railway car spotted alongside. The scraper is driven from a Washington Iron Works three-drum hoist, steam-driven. W. B. Arndt, general superintendent, who has charge of all the operations of the Hauser Construction Co. in southern California, has applied for a patent on the screening device. By use of this screen 75% of the material placed on the grizzly is reclaimed and is suitable for core rock.

Dredge Sleeve "Kink"

IF YOU HAVE ever had to shut down your dredge pump and send the gang out to repair a broken, leaky or slipped pipe-line sleeve, the illustration may be the means of your saving several times the yearly subscription price of ROCK PRODUCTS, with a little left over for your own "cut."

The Menantico Sand and Gravel Co., Millville, N. J., has several dredges and all of its sleeves are safeguarded by simply making a half hitch over each length of pipe with an old piece of conveyor or transmission drive chain, with the loose end having a short length of iron, such as an old bolt, shoved through to insure a secure tie. The transmission chain is then drawn taut with a couple of wooden wedges as shown in the illustration. This protects the rubber sleeve from slipping by relieving it of some of the natural strains that it would otherwise be subjected to.

Homemade "kink" protects dredge sleeve from slipping

Safe Air-Compressor Receiver

WE HAVE published several articles on the proper method to hook up a compressed-air receiver. A very simple problem, yet one that about 60% of the operators do not even attempt to solve. The common way is to hook up the receiver at any old place and in any old manner; and if someone were to go through the average plant and hang a sign, "This is the dirtiest place in the plant,"

A neat compressor cylinder. Note the concrete base

he would most likely hang it somewhere in the vicinity of the air receiver installation.

The one in the illustration is not only neatly installed but is kept in neat and orderly surroundings, and we take particular pains to point out the novelty of the design of the foundation—a concrete base on which rests a tee or cross made of 12-in. I-beams welded at the joints. Photograph taken at Berks Cast Stone Co., Reading, Penn.

Editorial Comment

Ready-Mixed Concrete Problems

The attempt to organize ready-mixed concrete manufacturers at Chicago last week brought out clearly the various factions in the industry, and the very real need of some kind of an organization, not merely for promotion but for co-ordination and protection. It is only too true that there is already a great surplus of industrial and commercial organizations and considerable benefit would come to those members who belong to two or more by consolidating their funds, energies and activities. But there does appear to be a genuine excuse for an organization of ready-mixed, or pre-mixed, or professionally-mixed, concrete manufacturers—"ready-mixed" is not sufficiently comprehensive to include the "transit-mixed" concrete producers, who have already organized a national association!

There are apparently four different industrial interests from which ready-mixed, or professionally-mixed concrete manufacturers come: (1) Aggregate producers; (2) building supply dealers; (3) contractors; (4) cement products manufacturers or independents. Each approaches the problems of making, selling and distributing mixed concrete from a different angle—often conflicting with the others. Thus far the portland cement manufacturer appears to have had no active participation, and of course he is not directly affected as yet very vitally. He will sell his cement anyhow, no matter who mixes the concrete—professional producers or construction contractors.

In the eyes of some cement manufacturers, however, the ready-mix concrete business is regarded none too friendly because it has a distinct tendency to upset existing dealer and customer relations, and very likely will end in depreciating individual brand prestige, since the responsibility of making good concrete is usually placed squarely on the ready-mixed concrete manufacturer, and with him desired results at minimum costs are more important than brand reputations. In any event the cement manufacturer will have to sell him as well as the ultimate consumer; and the experienced, scientific, ready-mixed concrete manufacturer is likely to be a consistent, close buyer, and eventually, probably, a very considerable one. And no seller likes to have an undue proportion of his "eggs in one basket."

To the sand, gravel, crushed stone or slag producer with city or metropolitan distributing facilities, the question of engaging in the ready-mixed concrete business or not may be the most vital question of business policy he has to decide. If city construction goes over in a large measure to ready-mixed concrete, as it seems likely to do when a progressive business man takes hold, the aggregate producer faces the loss of his investment in distributing facilities, his customer contacts, and possibly the loss of the greater part of his hard-built market, if he is in a territory where aggregates are plentiful.

With the development of a ready-mixed concrete demand the building supply dealers of a city are faced with the loss of cement and aggregate sales—and a loss of prestige. It has been and can be worked out so that dealers may sell ready-mixed concrete from a separately owned and operated plant on a commission basis. In any event the building supply dealer has probably less to lose than the metropolitan aggregate producer, and his chief reason for engaging in the ready-mixed concrete business is because he has facilities in the way of yards and trucks and customer contacts.

The construction contractor may engage in the ready-mixed concrete business because he has yard and trucking facilities, but probably his principal reason is merely to serve as an adjunct or facility to his contracting business. He is usually handicapped in his customer contacts by the fact that he is a contractor, and hence a competitor of his customers. We think few contractors will engage in the business, partly on that account, and partly because they will all shortly come to recognize that it is a specialty and will prefer to have their own concrete made by specialists.

In the case of the cement product manufacturer, or independent, the ready-mix business is just another venture and is of no particular significance to the industry.

One thing all ready-mix producers have in common is to see that the material produced and sold has the virtues ascribed to it. In other words the chief excuse for a central mixing or central batching plant is the opportunity for producing a concrete mix of scientifically controlled proportions and a resulting concrete of guaranteed characteristics and quality. Hence every effort should be made by those in the industry to produce a real quality product and to discourage and prevent so far as they can the production and sale of shoddy material which will bring into question and probable disrepute all so-called ready-mixed concrete.

It seems to us that the city aggregate producer is the most logical of the four interests to engage in the ready-mix business, not only because he seems to have the largest stake to lose by not doing so, but because he knows, or should know, his aggregates and how to use them to the best advantage, better than anyone else. Moreover, he should know that aside from skill in mixing and proportioning the ingredients, the character and quality of the aggregates are probably the most important factors in a quality product. As a producer he naturally would have more pride in turning out a quality product than the mere dealer. Whether he is selling aggregates as such, or mixed concrete, he is, in the final analysis, *selling concrete,* and his business will rise or sink according to the success or failure of his customers with *concrete*. So, if by taking a hand in the actual manufacture of concrete he can insure its success, he is merely insuring the success of his aggregate business; and it is hard to see how he can insure its success in any other way.

From this point of view, it seems to us that the suggestion that one or all three of the aggregate associations take an active part in organizing the ready-mix industry is entirely logical. It seems at this time that it is unlikely that the ready-mix manufacturers can be organized as a branch or division of any one of the three aggregate associations. We think it is unfortunate that there should be three aggregate associations. Had there been but one, it very likely could have controlled the situation to the advantage of all. (And this is only one of many interests that producers of aggregates have in common.)

The National Sand and Gravel Association deserves much credit for helping to bring about the preliminary meeting in Chicago, and it can very well afford to organize a separate division of its own association for the ready-mix manufacturers among its own membership. It goes without saying that the other aggregate associations should do likewise; and, perhaps, eventually their united efforts may regulate the ready-mix business to its rightful and proper place in the economy of the construction materials industry.

Of course, the point was raised at the Chicago meeting, and it undoubtedly arises in the mind of the reader now, why the Portland Cement Association does not take the initiative in organizing and promoting ready-mixed concrete. We don't know the reasons why the P. C. A. doesn't do this, but we can think of several reasons of our own why it does not want to do so. One and a sufficient reason is that there probably is no unanimity among the members of the association. It is inevitable that if the making of concrete comes into the hands of a relatively few specialists, differences in so-called standard portland cements will become much more widely and forcibly recognized than at present. As we have already suggested, probably more cement will, under those conditions, be purchased for certain desired results using certain aggregates than will be purchased because of brand reputation or prestige. In these and other ways the long established contacts and policies of cement manufacturers may be radically changed. So while we may assume that no one is more interested in the production or manufacture of scientifically proportioned concrete, or concrete of specific and assured properties, than the cement manufacturer, it is almost too much to except them at this stage of the game to come out very enthusiastically, or unanimously, in favor of the ready-mixed concrete business.

The ready-mix business requires the earnest and thoughtful attention and assistance of all the various interested factions, and none can any longer afford to ignore it, or the problems it is offering for solution. It is regrettable we must tackle these problems in such an uncoordinated fashion, but probably time will help to straighten them out.

H. J. Schweim Heads New Gypsum Association

GYPSUM products manufacturers have formed a new association, succeeding the Gypsum Institute, of New York City. Henry J. Schweim, engineer, formerly with the United States Gypsum Co., has been made chief engineer and executive secretary of the new association, whose headquarters are in the Chicago Evening Post building, 211 West Wacker drive, Chicago, Ill.

Twelve of the principal gypsum products manufacturers have already joined and more are expected to join soon. The activities of the new association will be largely promotional, dealing particularly with building codes, etc. The traffic bureau work will continue under W. J. Fitzgerald, who has handled this branch of the industry for many years under three previous organizations of the gypsum producers.

It is expected to have district offices in New York City and on the West Coast, eventually. At the present time the West Coast gypsum manufacturers are not members of the association.

The officers of the new Gypsum Association are: James Leenhouts (Grand Rapids Plaster Co.), president; C. F. Henning (United States Gypsum Co.), first vice-president; L. I. Neale (Atlantic Gypsum Products Co.), second vice-president; Eugene Holland (Universal Gypsum and Lime Co.), treasurer. The executive committee consists of Messrs. Leenhouts, Henning and Neale.

The membership comprises the following corporations: American Gypsum Co., Port Clinton, Ohio (3 plants); Atlantic Gypsum Products Co., Boston, Mass. (3 plants); Best Bros. Keene's Cement Co., Medicine Lodge, Kan. (1 plant); Certain-teed Products Co., New York City (6 plants); Ebsary Gypsum Co., Wheatland, N. Y. (1 plant); Federal Gypsum Co., Des Moines, Iowa (1 plant); Grand Rapids Plaster Co., Grand Rapids, Mich. (3 plants); National Gypsum Co., Buffalo, N. Y. (2 plants); Oakfield Gypsum Products Corp., Oakfield, N. Y. (1 plant); Structural Gypsum Co., Linden, N. J. (2 plants); Universal Gypsum and Lime Co., Chicago, Ill. (5 plants); United States Gypsum Co., Chicago, Ill. (26 plants). This list represents a very large part of the industry east of the Rocky Mountains. As before noted, it is expected that western producers will join with the establishment of a Pacific Coast district office.

Henry J. Schweim

Ripon Limestone Co. Has New Manager

ROY J. NELLIS, who has conducted a battery service station and automobile sales agency on Jackson street, Ripon, Wis., for the past fifteen years, acquired the quarry and machinery of the Ripon Limestone Co., of which William Kroll was manager. Mr. Nellis will take possession of the property at once and operations at the quarry are to commence within a few days. A meeting of the Board of Public Works held Wednesday resulted in the letting of a contract to Mr. Nellis for furnishing the city's requirements of crushed stone. The quarry on Seward's Hill has been working for some thirty years. At one time a considerable quantity of building stone was quarried, but in late years the operation of an extensive stone crushing apparatus was the principal industry.—*Ripon* (Wis.) *Press.*

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[29]	5-19-30	95	100	
Alpha P. C. new com.	5-16-30	32	.....	75c qu. Apr. 15
Alpha P. C. pfd.	5-17-30	110	.....	1.75 qu. Mar. 15
American Aggregates com.[39]	5-19-30	21	26	75c qu. Mar. 1
Am. Aggre. 6's, bonds (w.w.)	5-16-30	85	.....	
American Brick Co., sand-lime brick	5-19-30	.....	5	25c qu. Feb. 1
American Brick Co. pfd., sand-lime brick	5-19-30	72	.....	50c qu. May 1
Am. L. & S. 1st 7's[29]	5-19-30	96	97	
American Silica Corp. 6½'s[49]	5-20-30	No market		
Arundel Corp. new com.	5-17-30	44	45	75c qu. Apr. 1
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10]	5-20-30	No market		
Beaver P. C. 1st 7's[29]	5-17-30	94	98	
Bessemer L. & C. Class A[4]	5-16-30	31	33	75c qu. May 1
Bessemer L. & C. 1st 6½'s[4]	5-16-30	85	90	
Bloomington Limestone 6's[29]	5-19-30	83	86	
Boston S. & G. new com.[47]	5-17-30	17	20	40c qu. Apr. 1
Boston S. G. new 7% pfd.[47]	5-17-30	47	50	87½ qu. Apr. 1
California Art Tile A	5-16-30	.....	13½	43¾c qu. Mar. 31
California Art Tile B	5-16-30	.....	5	20c qu. Mar. 31
Calaveras Cement com.	5-16-30	13	14½	
Calaveras Cement 7% pfd.	5-16-30	86¼	89	1.75 qu. Apr. 15
Canada Cement com.	5-19-30	17¾	18¼	
Canada Cement pfd.	5-19-30	97	98	1.62½ qu. Mar. 31
Canada Cement 5½'s[45]	5-16-30	99½	100	
Canada Cr. St. Corp. bonds[43]	5-16-30	96	.....	
Certainteed Prod. com.	5-19-30	9	9⅛	
Certainteed Prod. pfd.	5-19-30	25	29	1.75 qu. Jan. 1
Cleveland Quarries	5-19-30	66	70	75c qu. 25c ex Jun 1
Columbia S. & G. pfd.	5-19-30	94½	96	
Consol. Cement 1st 6½'s, A	5-20-30	85	90	
Consol. Cement 6½% notes[24]	5-20-30	75	85	
Consol. Cement pfd.[29]	5-19-30	50	60	
Consol. Oka S. & G. 6½'s[12] (Canada)	5-15-30	100	101	
Consol. Rock Prod. com.[44]	5-15-30	2	2¾	
Consol. Rock Prod. pfd.[44]	5-15-30	10½	11½	43¾c qu. June 1
Consol. Rock Prod. units	5-15-30	23	26	
Consol. S. & G. pfd. (Can.)[43]	5-16-30	82	85	1.75 qu. May 15
Construction Mat. com.	5-19-30	19	21	
Construction Mat. pfd.	5-19-30	41	42	87½c qu. May 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[18]	5-17-30	93	97	
Coosa P. C. 1st 6's[29]	5-19-30	50	60	
Coplay Cem. Mfg. 1st 6's[40]	5-19-30	95	.....	
Coplay Cem. Mfg. com.[40]	5-19-30	10	.....	
Coplay Cem. Mfg. pfd.[40]	5-19-30	60	.....	
Dewey P. C. 6's (1942)	5-20-30	98	.....	
Dewey P. C. 6's (1930)	5-20-30	98	.....	
Dewey P. C. 6's (1931-41)	5-20-30	98	.....	
Dolese & Shepard	5-19-30	84	88	$2 qu. Apr. 1
Dufferin Pav. & Cr. Stone com.	5-19-30	.....	21¼	
Dufferin Pav. & Cr. Stone pfd.	5-19-30	92½	93	
Edison P. C. com.[39]	5-16-30	10c	.....	
Edison P. C. pfd.[39]	5-16-30	25c	.....	
Giant P. C. com.[2]	5-19-30	7	14	
Giant P. C. pfd.[2]	5-19-30	20	30	
Gyp. Lime & Alabastine, Ltd.	5-19-30	22¾	23	37½c qu. Apr. 1
Hermitage Cement com.[11]	5-17-30	25	35	
Hermitage Cement pfd.[11]	5-17-30	80	90	
Ideal Cement, new com.	5-19-30	55	58	75c qu. Apr. 1
Ideal Cement 5's, 1943	5- 7-30	97	99	
Indiana Limestone com.[29]	4-21-30	3	5	
Indiana Limestone pfd.[29]	4-21-30	No market		1¾% qu. June 1
Indiana Limestone 6's	5-17-30	84½	.....	
International Cem. com.	5-19-30	66¼	67½	$1 qu. Mar. 28
International Cem. bonds 5's	5-16-30	100⅞	.....	Semi-ann. int.
Iron City S. & G. bonds 6's	4-21-30	95	.....	
Kelley Is. L. & T. new st'k	5-19-30	40	45	62½c qu. Apr. 1
Ky. Cons. St. com. V. T. C.[48]	5-15-30	9	11	
Ky. Cons. Stone 6½'s[48]	5-15-30	94	98	
Ky. Cons. Stone pfd.[48]	5-15-30	87½	90	1.75 qu. May 1
Ky. Cons. Stone com.[48]	5-15-30	9	11	
Ky. Rock Asphalt com.[11]	5-17-30	15	17	40c qu. Apr. 1
Ky. Rock Asphalt pfd.[11]	5-17-30	85	95	1.75 qu. Mar. 1
Ky. Rock Asphalt warrants	5-20-30	3	5	
Ky. Rock Asphalt 6½'s[11]	5-17-30	98	102	
Lawrence P. C.	5-17-30	61	66	$1 qu. Mar. 29
Lawrence P. C. 5½'s, 1942	5- 7-30	83	.....	
Lehigh P. C.	5-17-30	37½	40	62½c qu. May 1
Lehigh P. C. pfd.	5-17-30	107¼	108¼	1¾% qu. July 1
Louisville Cement[48]	5-20-30	250	.....	
Lyman-Richey 1st 6's, 1932[13]	5-19-30	97	99	
Lyman-Richey 1st 6's, 1935[13]	5-19-30	97	99	
Marblehead Lime 6's[14]	5-16-30	95	98	
Marbelite Corp. com.	5-15-30	310	.....	
Marbelite Corp. pfd.	5-15-30	12½	.....	50c qu. Apr. 10
Material Service Corp.	5-20-30	21½	24	50c qu. June 1
McGrady-Rogers 7% pfd.	5-16-30	50	53	
McGrady-Rogers com.	5-16-30	20½	21	
Medusa Portland Cem.[29]	5-19-30	95	.....	1.50 Apr. 1
Mich. L. & C. com.[6]	5-17-30	15	.....	
Missouri P. C.	5-19-30	30	30½	50c qu. May 1
Monolith Portland Midwest[14]	5-15-30	3¾	4	
Monolith bonds, 6's[9]	5-15-30	85½	87½	
Monolith P. C. com.	5-16-30	6⅛	.....	40c s.-a. Jan. 1
Monolith P. C. pfd.[9]	5-15-30	5	6	40c s.-a. Jan. 1
Monolith P. C. units[9]	5-15-30	13½	16	
National Cem. (Can.) 1st 7's[43]	5-16-30	99½	.....	
National Gypsum A com.	5-19-30	6½	7½	
National Gypsum pfd.	5-19-30	36	38	
Nazareth Cement com.[26]	5-17-30	22	.....	
Nazareth Cement pfd.[26]	5-17-30	98	.....	
Newaygo P. C. 1st 6½'s[29]	5-19-30	101¾	.....	
New Eng. Lime 1st 6's[14]	5-16-30	90	95	
N. Y. Trap Rock 1st 6's	5-19-30	100½	101	
N. Y. Trap Rock 7% pfd.[38]	5- 5-30	95	.....	1.75 qu. Apr. 1
North Amer. Cem. 1st 6½'s	5-16-30	63¼	64¼	
North Amer. Cem. com.[29]	5-19-30	5	.....	
North Amer. Cem. 7% pfd.[29]	5-19-30	30	.....	
North Amer. Cem. units[29]	4-21-30	22	25	
North Shore Mat. 1st 5's[15]	5-20-30	95	.....	
Northwestern States P. C.[37]	5- 5-30	110	115	$2 Apr. 1
Ohio River Sand com.	5-19-30	.....	17	
Ohio River Sand 7% pfd.	5-19-30	98	.....	
Ohio River S. & G. 6's[16]	5-17-30	85	95	
Oregon P. C. com.[20]	5-17-30	9	10	
Oregon P. C. pfd.[9]	5-15-30	95	100	
Pacific Coast Aggregates pfd.	5- 5-30	10	15	
Pacific Coast Cement 6's[5]	3-20-30	80	85	
Pacific P. C. com.	5-16-30	26	27	
Pacific P. C., new pfd.	5-16-30	80	85	1.62½ qu. Apr. 5
Pacific P. C. 6's	5-16-30	99½	.....	
Peerless Cement com.[21]	5-19-30	8	9	
Peerless Cement pfd.[21]	5-19-30	80	85	1.75 Apr. 1
Penn.-Dixie Cement pfd.	5-19-30	40	49	
Penn.-Dixie Cement com.	5-19-30	8⅛	8¼	
Penn.-Dixie Cement 6's	5-19-30	85	.....	
Penn. Glass Sand Corp. 6's	5- 7-30	101	103	
Penn. Glass Sand pfd.	5- 7-30	110	.....	1.75 qu. Apr. 1
Petoskey P. C.	5-19-30	9¼	10	15c qu. Apr. 1
Port Stockton Cem. units[9]	2-17-30	.....	30	
Port Stockton Cem. com.[20]	5-17-30	No market		
Riverside Cement com.	5-16-30	12	15	
Riverside Cement pfd.[20]	5-17-30	73	78	1.50 qu. May 1
Riverside Cement, A[20]	5-17-30	11	15	31¼c Feb. 1
Riverside Cement, B[20]	5-17-30	2	.....	
Roquemore Gravel 6½'s[17]	5-17-30	99	100	
Santa Cruz P. C. 1st 6's, 1945[5]	3-20-30	105¾	.....	6% annually
Santa Cruz P. C. com.	5-16-30	91	.....	$1 qu. Apr. 1
Schumacher Wallboard com.	5-16-30	11	12½	
Schumacher Wallboard pfd.	5-16-30	20	24	50c qu. May 15
Southwestern P. C. units[44]	5-15-30	240	.....	
Standard Paving & Mat. (Can.) com.	5-16-30	22	22½	50c qu. May 15
Standard Paving & Mat. pfd.	5- 5-30	.....	84¾	1.75 qu. Feb. 15
Superior P. C., A	5-16-30	.....	42	27½c mo. June 1
Superior P. C., B	5-16-30	11¾	12	25c qu. Mar. 20
Trinity P. C. units[37]	5- 5-30	120	130	
Trinity P. C. com.[37]	5- 5-30	40	.....	
Trinity P. C. pfd.[29]	5-19-30	100	110	
U. S. Gypsum com.	5-19-30	47	48	40c qu. June 30
U. S. Gypsum pfd.	5-20-30	115	121	1.75 qu. June 30
Universal G. & L. com.[3]	5-20-30	.....	50c	
Universal G. & L. pfd.[3]	5-20-30	5	.....	
Universal G. & L., V. T. C.[3]	5-20-30	No market		
Universal G. & L. 1st 6's[3]	5-20-30	No market		
Warner Co. com.[16]	5-17-30	44	47	50c qu. Apr. 15
Warner Co. 1st 7% pfd.[16]	5-17-30	102	105	1.75 qu. Apr. 1
Warner Co. 1st 6's (w. w.)	5-20-30	99½	100	
Whitehall Cem. Mfg. com.[36]	5- 5-30	40	.....	
Whitehall Cem. Mfg. pfd.[36]	5- 5-30	48	.....	
Wisconsin L. & C. 1st 6's[15]	5-20-30	95	.....	
Wolverine P. C. com.	5-19-30	4½	5¼	15c qu. May 15
Yosemite P. C., A com.[20]	5-17-30	2½	3	

Quotations by: [1]Watling Lerchen & Hayes Co., Detroit, Mich. [2]Bristol & Willett, New York. [3]Rogers, Tracy Co., Chicago. [4]Butler Beadling & Co., Youngstown, Ohio. [5]Freeman, Smith & Camp Co., San Francisco, Calif. [6]Frederic H. Hatch & Co., New York. [7]J. J. B. Hilliard & Son, Louisville, Ky. [8]Dillon, Read & Co., Chicago, Ill. [9]A. E. White Co., San Francisco, Calif. [10]Lee Higginson & Co., Boston and Chicago. [11]J. W. Jakes & Co., Nashville, Tenn. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Stern Bros. & Co., Kansas City, Mo. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Citizens Southern Co., Savannah, Ga. [18]Dean, Witter & Co., Los Angeles, Calif. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simons & Co., Inc., Detroit, Mich. [22]Hemphill, Noyes & Co., New York. N. Y. [24]A. B. Leach & Co., Inc., Chicago, Ill. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [29]Bank of Republic, Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago, Ill. [36]Boettcher Newton & Co., Denver, Colo. [36]Hanson and Hanson New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [38]McFetrick & Co., Montreal, Quebec. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroc_k, New York. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney, Williams & Co., Los Angeles, Calif. [46]Stein Bros. & Boyce, Baltimore, Md. [47]Wise, Hobbs & Arnold, Boston. [48]E. W. Hays & Co., Louisville, Ky. [49]Blythe Witter & Co., Chicago, Ill.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
Atlantic Gypsum Products Co. 6's, 1941, $4,000 and 40 shs. com.[1]	35%	.....
Atlantic Gypsum Products 6's, 1941, $5,000; 50 shs. com. as bonus[3]	49%	.....
Consolidated Cem. com. v.t.c., 3220 shs.[1]	1½ per share	.....
Indiana Limestone deb. 7's, 1936, with warrants ($1,000)[4]	$500 for the lot	.....

[1]Price at auction by Wise, Hobbs & Arnold, Boston, Dec. 18, 1929. [3]Price at auction by R. L. Day & Co., Boston, Dec. 18, 1929. [4]Price at auction by Adrian H. Muller & Son, Dec. 26, 1929.

Kelley Island Lime and Transport Company's Annual Report

FOLLOWING are extracts from the annual report to stockholders of the Kelley Island Lime and Transport Co. by G. J. Whelan, president:

"The continuation of unsatisfactory conditions in the building industry of the country naturally reflected itself in the downward trend of the earnings of the company for the year 1929.

"Funds ordinarily available to finance building operations were attracted to other channels by high interest rates, and in many of the larger cities, important markets for our building limes, building had already exceeded the demand. The reduced consumption of building materials, coupled with the present over-productive capacity, induced some manufacturers to attempt to maintain a high percentage of capacity output by offering their products at little or no profit to themselves,, which had the effect of bringing about substantially lower sales prices with narrowing profits.

"The readjustment that has been taking place for the last six months has corrected the first of these conditions and builders now find no difficulty in obtaining money for construction projects of merit. Time only will correct the condition where cities are overbuilt. However, authorities generally agree that we may look for a gradual improvement. A construction program of huge magnitude is looked for during the current year and, while it has been slow in getting started, believe it is gaining in impetus daily.

"The demands for fluxing stone for the steel industry continued at a high rate during the first three quarters of 1929, but the increases for that period were somewhat offset by the suddenly decreased demand in the last quarter, and extremely adverse weather conditions interfered with the production and shipment of fluxing stone, particularly for lake movement, in the closing months.

"While the construction and steel industries provide large markets for the company's products, it is not confined to these two outlets. The company produces a very wide range of products that find ready markets in practically every important modern industry, and this diversification contributed to the fact that the final results for the year 1929 were highly satisfactory. Net profit for the year amounted to $917,615.19 after all charges, including depreciation and depletion, taxes and federal income tax, were deducted. The financial condition of the company is good, there being no obligations in the form of notes or funded debt and the financial statement indicates a very satisfactory ratio of quick assets to quick liabilities.

"During the year a total of $147,640.77 was spent for plant improvements, etc., credits resulting principally from the sale of the steamer *Clinton*, barges *Kelley* and *Pellet* and the tug *Fitzgerald*, bringing the net charges to property account down to $93,935.56. Depreciation and depletion amounting to a total of $311,297.25 was charged to the costs of operation for the year.

"All of the old wooden boats of the sand fleet have either been retired or sold, and the steel boats *Hydro, Kelley Island* and *McKerchey* are equipped with modern self-unloading equipment. Another steel boat, larger than those now in operation, has been added to the fleet, and is now being remodeled by the addition of modern pumping and unloading equipment. It is expected that this boat will be in operation by midsummer.

"Efforts have been directed toward the improvement of plants and equipment with the view of bringing about reduced costs or placing ourselves in position to meet the changing trade demands."

KELLEY ISLAND LIME AND TRANSPORT CO. BALANCE SHEET
(December 31, 1929)

ASSETS

Current:		
Cash	$ 389,278.15	
U. S. Government securities (at cost)	3,117,244.07	
Notes and accounts receivable, less allowance for doubtful, etc.	495,074.14	
Inventories	663,137.11	
Dividend receivable	20,000.00	
		$4,684,733.47
Investment in stocks and bonds, etc.		229,135.73
Other assets		35,525.38
Permanent investment in land, buildings, machinery and equipment, less allowance for depletion and depreciation		6,638,270.72
Investments in subsidiary companies		408,616.68
Insurance reserves (cash and U. S. Liberty bonds)		359,568.21
Deferred: Prepaid taxes, unexpired insurance, etc.		22,009.62
		$12,377,859.81

LIABILITIES

Current:		
Accounts payable	$ 91,403.10	
Dividends payable January 2, 1930	347,571.00	
Income tax accrued—estimated	109,126.83	
Taxes and insurance accrued	82,293.79	
		$ 630,394.72
Insurance reserves		359,568.21
Capital stock (no par common) Authorized, 400,000 sh. Issued, 308,952 shares	7,723,800.00	
Profit and loss—surplus	3,664,096.88	
		11,387,896.88
		$12,377,859.81

INCOME AND EXPENSE FOR YEAR ENDING DECEMBER 31, 1929

Operating profit	$1,205,806.14
Selling, general and administrative expense	324,211.71
Net operating profit	$ 881,594.43
Other income, less miscellaneous deductions	145,147.59
Profit before providing for income tax	$1,026,742.02
Provision for income tax	109,126.83
Net profit	$ 917,615.19

Recent Dividends Announced

Consolidated Rock Prod. pfd. (qu.)	$0.43¾	June 1
Lehigh P. C. pfd. (qu.)	1¾%	July 1
Material Service (qu.)	0.50	June 1
Schumacher Wallboard pfd. (qu.)	0.50	May 15
Superior P. C. (mo.)	0.27½	June 1
U. S. Gypsum com. (qu.)	0.40	June 30
U. S. Gypsum pfd. (qu.)	1.75	June 30

Consolidated Cement Report

THE ANNUAL REPORT of the Consolidated Cement Corp. (John L. Senior, president) for the year 1929, dated April 28, 1930, contains the following:

"The 1929 shipments amounted to 1,915,605 bbl., which is approximately a 2% decrease in tonnage under 1928, and this together with decreased prices accounted for a loss in the amount of net sales of about $115,000. Production cost showed only a negligible increase over 1928, but sales costs increased due to keener competition and the necessity of enlarging our sales force and activities.

"During the first half of the year shipments were substantially curtailed because of adverse weather conditions, with the result that the heaviest shipments were made in the last six months, at which time prices were lower than during the first six months.

"The price situation for 1930 promises better returns. Shipments to April 22, 1930, were 35,000 bbl. ahead of 1929 and unfilled orders on the books show an increase of 321,000 bbl. over last year."

PROFIT AND LOSS STATEMENT

Net sales	$2,736,839.31
Other income (net)	25,372.96
Gross income	$2,762,212.27
Cost of cement sold, selling and administrative expense (exclusive of depreciation and depletion)	*2,246,203.26
Net earnings	$ 516,009.01
Depreciation and depletion	194,265.53
Balance available for interest, amortization, federal taxes, etc.	$ 321,743.48
Annual interest requirements on $3,728,600 first mortgage 6½% bonds	$ 243,359.00
Annual interest requirements on $1,081,500 sinking fund 6½% convertible gold notes	70,297.50

*Includes $172,777.34 charged to maintenance.

CONDENSED BALANCE SHEET

ASSETS

	Dec. 31, 1929
Cash, including temporary investment of surplus cash funds	$ 562,806.42
Accounts and notes receivable (net)	330,369.12
Inventories of cement, materials and supplies	485,920.85
Inventories of cloth and paper sacks	181,294.01
Current assets	$1,560,390.40
Prepaid expenses	33,189.69
Investments and other sundry assets	99,702.91
Plants, properties and quarry lands—At appraised sound values, as determined by American Appraisal Co., depreciated to date of acquisition plus subsequent additions at cost, subject to reserve for depreciation per contra	6,415,521.80
Unamortized bond and note discount and expense, organization expense, etc.	347,701.14
Goodwill	1.00
	$8,456,506.94

LIABILITIES AND NET WORTH

Accounts payable, accrued salaries, local taxes, interest, etc., and reserve for federal taxes	$ 280,469.55
Sinking fund 6½% convertible gold notes, due March 1, 1931	1,081,500.00
First mortgage 6½% gold bonds, Series A, due March 1, 1941, less amount held by trustee for cancellation	3,728,600.00
Reserve for depreciation and depletion subsequent to date of acquirement of properties	801,333.26
Reserve for contingencies	75,404.45
7% cumulative preferred stock, $100 par value, 14,654 shares outstanding, of which 726 shares are in treasury at December 31, 1929	1,392,800.00
No par value common stock, 100,000 shares issued and outstanding; declared value	100,950.00
Capital surplus	727,199.86
Earned surplus	268,249.82
	$8,456,506.94

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended Apr. 19	Sand, Stone and Gravel Week ended Apr. 19
Eastern	3,135	6,495
Allegheny	2,662	5,922
Pocahontas	533	1,331
Southern	832	8,826
Northwestern	1,054	3,835
Central Western	484	10,117
Southwestern	525	7,922
Total	9,225	44,448

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1929 AND 1930

District	Limestone Flux 1929 Period to date Apr. 20	Limestone Flux 1930 Period to date Apr. 19	Sand, Stone and Gravel 1929 Period to date Apr. 20	Sand, Stone and Gravel 1930 Period to date Apr. 19
Eastern	39,641	35,930	49,022	44,979
Allegheny	46,316	36,624	47,825	49,958
Pocahontas	3,920	4,018	6,692	11,178
Southern	7,167	10,086	113,994	102,381
Northwestern	11,021	10,066	30,553	24,603
Central Western	8,056	7,538	95,796	100,871
Southwestern	6,584	5,726	79,820	76,423
Total	122,705	109,988	423,702	410,330

COMPARATIVE TOTAL LOADINGS, 1929 AND 1930

	1929	*1930*
Limestone flux	***122,705***	***109,988***
Sand, stone, gravel	***423,702***	***410,330***

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning May 17:

CENTRAL FREIGHT ASSOCIATION DOCKET

24735. To establish on **crushed stone** (in bulk) **and limestone, agricultural** (in open-top cars only), carloads, Sibley, Mich., to La Grange, Ind., rate of $1.25 per net ton. Present rate, 21½c.

24736. To establish on **sand** (other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, carloads, Saegertown, Penn., to Argentine, Penn., rate of 90c per ton of 2000 lb. Present rate, 17c.

24750. To establish on **crushed stone**, carloads, from East Liberty, O., to Morain, O., rate of 95c per net ton. Present rate, $1 per net ton.

24754. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, carloads, Columbus, O., to Bowling Green, O., rate of $1.20 per net ton. Present rate, $1.05 per net ton.

24756. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, carloads, Wolcottville, Ind., to Pioneer Siding, O., rate of 68c per net ton. Route—Via Wabash Ry. direct. Present rate, 76c per net ton.

24757. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, carloads, Wolcottville, Ind., to Marley, Ill., rate of $1 per net ton. Route—Via Wabash Ry. direct. Present rate, 17c.

24758. To establish on **crushed stone, crushed stone screenings and agricultural limestone** (not ground or pulverized), in bulk in open-top cars, carloads, from Whitehouse, O.

To	Miles	Prop. Per net ton	Pres. Per 100 lb.
Pettisville, O.	54	85	11½
Archbold, O.	58	90	11½
Stryker, O.	64	90	13
Bryan, O.	71	95	13
Melbern, O.	76	100	13½
Edgerton, O.	81	100	13½

Route—Via Wabash Ry., Toledo, O., and N. Y. C. R. R.

24768. To establish on **crushed stone and crushed stone screenings**, carloads, Bluffton, Ind., to New Lisbon, Ind., rate of 85c per 2000 lb. Route—N. Y. C. & St. L. R. R. direct. Present rate, 88c per ton of 2000 lb. (intermediate to Cambridge City, Ind.).

24771. To establish on **sand and gravel**, in open-top cars, carloads, Kinnickinnick, O.

To	Prop.	Pres.
Kinderhook, O.	*70	Class rates
Stoutsville, O.	*70	Class rates
Johnsons, O.	*75	Class rates

*When in box cars, see Note 1 of tariff.

Route—Via N. & W. Ry., Circleville, O., Pennsylvania R. R.

24772. To establish on **sand and gravel**, all kinds, carloads, Gravel Pit, O.

To	Prop.	Pres.
Mount, Oreb, O.	* 70	70
Macon, O.	* 70	‡70
Winchester, O.	* 80	90
Seaman, O.	* 85	‡100
Peebles, O.	* 90	100
Beaver Pond, O.	* 90	‡110
Otway, O.	* 95	‡110
McDermott, O.	*100	‡110
Portsmouth, O.	*105	110

*When in box cars, see Note 10 of tariff.
‡Applicable under intermediate rule of tariff.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

24774. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, carloads, Richmond, Ind., to Geneva and Berne, Ind., rate of 80c per net ton. Present rate, 88c per net ton.

24782. To establish on **agricultural limestone; crushed stone**, in bulk, in open-top cars; **stone**, rip-rap, in open cars; **stone screenings**, in open-top cars, and **stone tailings**, in bulk, in open cars, carloads, from Greencastle and Limedale, Ind., to Knightstown and Dunreith, Ind., rate of 90c per net ton. Present rate, $1.01 per net ton.

24783. To establish on **agricultural limestone** (not ground or pulverized), unburned; **stone, crushed,** and **stone screenings**, in bulk, in open-top cars, in straight or mixed carloads, and on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) **and gravel**, carloads, Kenneth and Lake Ciecott, Ind., to destinations in Indiana on Penn. R. R.:

Stone from Kenneth, Ind.

To	Pres.	Prop.	To	Pres.	Prop.
Centre	85	70	Greenwood	127	105
Hemlock	85	70	Whiteland	127	105
Nevada	85	75	Franklin	127	105
Windfall	85	75	Amity	139	110
Curtisville	85	75	Edinburg	127	110
Elwood	85	80	Taylorsville	127	110
Frankton	85	80	Columbus	130	115
Southport	110	105	Greenfield	127	*105

Sand and Gravel, from Kenneth and Lake Ciecott, Ind., to Penn. R. R. destinations in Indiana:

To	Pres.	Prop.	To	Pres.	Prop.
Center	85	70	Curtisville	88	75
Hemlock	85	70	Elwood	88	80
Nevada	85	75	Frankton	95	80
Windfall	88	75			

*Route via Indianapolis, Ind.

24784. To establish on **agricultural limestone** (not ground or pulverized) unbroken, **stone, crushed; stone screenings,** in bulk, in open-top cars, in straight or mixed carloads, and **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) **and gravel**, carloads, Kenneth and Lake Ciecott, Ind., to Medaryville, Clarks and Anthonys, Ind., rate of 85c per net ton. Present rate, $1.01 per net ton.

24785. To establish on **agricultural limestone**, unburned, in open-top cars only; **stone, crushed**, in open-top cars, in bulk only, and **stone screenings**, in open cars, in bulk only, in straight or mixed carloads. Rates from Piqua, O., to Indiana and Michigan points.

To	Pres.	Prop.	To	Pres.	Prop.
Lynn	(*)	90	Franklin	‡189	125
Warsaw	(*)	125	Winona Lake	(*)	125
Bunker Hill	‡176	115	Hoovers	(*)	125
Kewanna	†135	125	Denver	(*)	125
De Long	†135	135	Newton	(*)	135
Hibbard	†135	135	N. Manchester	(*)	135
Clermont	(*)	125	S. Whitley	(*)	135
Lebanon	(*)	125	Kalamazoo§	‡227	145
Frankfort	(*)	135			

*Classification basis.
†Under intermediate application.
‡Applies only on agricultural limestone.
§Michigan.

24786. To establish on **crushed stone, crushed stone screenings** and **agricultural limestone** (not ground or pulverized), in bulk, in open-top cars, carloads, from Maple Grove (Narlo), Ohio.

To P. M. Ry. stas.	Pres.	N.K.P. Prop.	P.R.R. Prop.
Hart, Mich.	*	205	195
New Era, Mich.	*	195	195
Rothbury, Mich.	*	195	185
Shelby, Mich.	*	195	195
Whitehall-Montague, Mich.	*	195	185
Bitely, Mich.	*	185	185
Ludington, Mich.	*	195	195
Scottsville, Mich.	*	195	195
Custer, Mich.	*	195	185
Manistee, Mich.	*	205	195
Fountain, Mich.	*	195	195
Freesoil, Mich.	*	195	195
Reed City, Mich.	*	175	175

*Sixth class.

24800. To establish on **stone, crushed,** carloads, Melvin, O., to Carpenter, Gallipolis, Middleport, Pomeroy and Rutland, O.

	Prop.	Pres.		Prop.	Pres.
Carpenter	100	(*)	Pomeroy	100	(*)
Gallipolis	100	(†)	Rutland	100	(*)
Middleport	100	(*)			

*Sixth class. †120c via H. V.

24809. To establish on crushed stone, carloads:

To	From Thrifton, O.	From Melvin, O.
Mt. Oreb, O.	(4) 110	
White Oak, O.	(4) 110	
Sardinia, O.	(4) 110	
Macon, O.	(4) 110	
Winchester, O.	(4) 110	
Seaman, O.	(4) 110	
Lawshe, O.	(4) 110	
Peebles, O.	(4) 110	
Plum Run, O.	(5) 105	
Beaver Pond, O.	(5) 105	(6) 105
Mineral Springs, O.	(5) 105	(6) 105
Rarden, O.	(5) 100	(6) 105
Youngs, O.	(5) 100	(6) 105
Otway, O.	(5) 100	(6) 105
Henley, O.	(5) 100	(7) 105
Brookside, O.	(5) 100	(7) 115
Arion, O.	(5) 100	(7) 115
McDermott, O.	(5) 100	(7) 115
Roco, O.	(5) 100	(7) 115
Rushtown, O.	(5) 100	(8) 105
Rook, O.	(5) 100	(8) 105

(4) To apply via B. & O., Hillsboro, O., or Chillicothe, N. & W., or D. T. & I., Glen Jean, O., N. & W.

(5) To apply via B. & O., Chillicothe, O., N. & W., or D. T. & I., Glen Jean, O., N. & W.

(6) To apply via B. & O., Hillsboro, O., N. & W.

(7) To apply via B. & O., Hillsboro, O., or Chillicothe, O., N. & W.

(8) To apply via B. & O., Chillicothe, O., N. & W.

Present rates, classification basis.

24874. To establish on **sand and gravel**, carloads (See Note 2), from Lafayette, Ind., to Westville, Ind., rate of 85c per net ton. Present rate, 77c per net ton per C. I. & L. Ry., Tariff I.C.C. 4383.

24875. To establish on **crushed stone**, carloads

(See Note 2), from Greencastle, Ind., to Cherry Grove and Linden, Ind., rates as shown below:

	Pres.	Prop.
Cherry Grove	80	70
Linden	80	75

24876. To establish on **sand and gravel**, carloads, Hamilton, O., to Middletown, O., rate of 50c per net ton. Route, via B. & O. R. R. direct. Present rate, 60c per net ton.

24885. To establish on **crushed stone**, carloads (See Note 3), from Keeport, Ind., rate of 90c per ton of 2000 lb. (Cents per ton of 2000 lb.)

To	Pres.
Montmorenci, Ind.	104
Otterbein, Ind.	107
Templeton, Ind.	115

Route—Via Wabash Ry., Lafayette, Ind., and N. Y. C. & St. L. R. R.

24886. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) **and gravel**, carloads, from Toledo, O. Present rate, sixth class. (Rates in cents per net ton.)

To	Prop.	Pres.
West Branch, Mich.	185	450
Grayling, Mich.	195	470
Gaylord, Mich.	200	480

24888. To establish on **crushed stone**, carloads (See Note 3), from Keeport, Ind., to points in Indiana (rates in cents per ton of 2000 lb.):

To	Prop.	Pres.	To	Prop.	Pres.
Gravellotte	85	115	Linden	90	115
Taylors	85	115	Cherry Grove	95	115
South Raub	90	115	Manchester	95	270
Romney	90	115	Crawfordsville	95	270

Route—Via Wabash Ry., Lafayette, Ind., and C. & E. I. Ry.

24912. To establish on **sand and gravel**, carloads, Navarre, O., to Dover, O., rate of 70c per ton of 2000 lb. Route—Via W. & L. E. Ry., Justus, O., and B. & O. R. R. Present rate, 80c per ton of 2000 lb. per W. & L. E. Ry. Tariff 10C.

24913. To establish on **sand and gravel**, carloads, Cincinnati, O. Rates in cents per ton of 2000 lb. (From Ohio points.)

	*Prop.	Pres.‡		*Prop.	Pres.‡
Dresden	120	.....	S. Zanesville	120	151
Glass Rock	120	151	Thornville	120	151
Glenford	120	151	Wilbren	120	†
Howard	120	†	Yost	120	151
McLuney	90	†	Zanesville	120	151
New Lex'gt'n	120	151	Bremen	120	151
Rushville	120	151			

*Interstate rate. (Present intrastate rate.)
‡Interstate rate.
†No commodity rate in effect.

24914. To establish on **sand**, in box cars, carloads, Toledo, O., to Canton, O., rate of 138c per ton of 2000 lb. Present rate, 161c per ton of 2000 lb.

24917. To establish on **sand and gravel**, carloads, Cleves, O., to Yellow Bank and Metamora, Ind., rate of 70c per net ton. Present rate, to *Yellow Bank and Metamora, Ind., rate of 85c per net ton.

*Metamora, Ind., rate account intermediate.

24922. To establish on **sand and gravel**, carloads, Tecumseh, Mich., to Delta, O., rate of 84c per ton of 2000 lb. Present rates, 92c (by D. T. & I.) and 84c (by N. Y. C.) per ton of 2000 lb.

24933. To establish on **spent or refuse grinding sand**, in open-top equipment, carloads, Butler, Penn., to West Winfield, Penn., rate of 70c per ton of 2000 lb. Present rate, 72c per ton of 2000 lb.

24931. To establish on **gravel and sand**, carloads, Dresden, O. (Cents per ton of 2000 lb.)

To	Prop.	Pres.
Orrville, O.	90	110*
Wooster, O.	100	120

*Rate on gravel is 90c.

24932. To establish on **sand**, carloads, Dresden, O., to Flagdale, O., rate of 70c per ton of 2000 lb. Present rate, 80c per ton of 2000 lb.

24948. To establish on (a) **sand**, viz.: **Blast, engine, foundry, glass, molding or silica**, and (b) **gravel and sand** (other than blast, engine, foundry, glass, molding or silica), in straight or mixed carloads, Louisville, Ky., to East Ft. Madison, Ill. (a) Rate of $3.40 and (b) rate of $3.11 per net ton. Present, classification basis.

24949. To establish on **crushed stone**, carloads, Muncie, Ind., to points in Indiana, rates as shown in Exhibit "A" attached. Present, sixth class.

EXHIBIT "A"

Statement of Rate from Muncie, Ind.
Crushed Stone.

To (representative) Indiana points:

	Prop.*		Prop.*
Indianapolis Division.			
Indianapolis	80	Winchester	70
Fortville	70	Harrisonville	70
Daleville	60		
Michigan Division.			
Wabash	85	Markleville	65
Summitville	70	Farmers	80
Springfield Division.			
Mt. Comfort	80	Modoc	85
Willow Branch	70	Carlos City	85
New Castle	75		

*In cents per net ton.

24947. To establish on **sand and gravel**, carloads, Indianapolis, Ind., to Jolietville and Rossston, Ind., 75c per net ton. Present, classification basis.

24960. To establish on **crushed stone**, carloads, Putnamville, Ind., on the C. I. & L. Ry. to P. R. R. stations, Brooklyn, Mooresville, Friendswood and Mars Hill, Ind. Present and proposed rates:

From	Pres.	Prop.
	To Martinsville, Ind.	
Putnamville, Ind.	97	....
	To Brooklyn, Ind.	
Putnamville, Ind.	C	97
	To Mooresville, Ind.	
Putnamville, Ind.	C	97
	To Friendswood, Ind.	
Putnamville, Ind.	C	97
	To Mars Hills, Ind.	
Putnamville, Ind.	C	97
	To Indianapolis, Ind.	
Putnamville, Ind.	97	....

C—Classification basis.

24968. To cancel Tariff I. C. C. L. S. 1479 covering rules governing car demurrage charges on **crushed stone, gravel and sand**, also other carload freight when loaded in open top equipment at Ashtabula Harbor, Cleveland and Sandusky for lake shipment or delivery to vessels.

24984. To establish on **limestone, ground or pulverized, and limestone dust**, carloads, minimum weight 50,000 lb., Greencastle, Ind., to Owensboro, Ky., rate of $3.20 per net ton. Present—Classification basis.

24985. To establish on **agricultural limestone (not ground or pulverized) unburned, stone, crushed and stone screenings**, in bulk, in open top cars, in straight or mixed carloads, and **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, carloads (See Note 3), Kenneth and Lake Ciecott, Ind., to Brookston and Ash Grove, Ind., rate of 80c per net ton. Route—Via P. R. R., Reynolds, Ind., C. I. & L. Ry. Present rate—$1.01 per net ton, per P. R. R. Tariff 125A and P. R. R. Tariff 117A.

TRUNK LINE ASSOCIATION DOCKET

23543. **Gravel and sand**, other than blast, core, engine, fire, foundry, glass, molding, quartz, silex and silica, carloads (See Note 2), Machias, N. Y., to Sinnemahoning, Penn., $1.25 per ton of 2000 lb. (Present rate, $1.40 per net ton.) Reason—Proposed rate is comparable with rates on like commodities for like distances, services and conditions.

23547. **Ground limestone**, carloads, minimum weight 50,000 lb., from Knickerbocker, Howellville, Rambo, Plymouth Meeting, Blue Bell and Devault, Penn.

To	Prop.
Boston, Mass., to Plymouth, N. H.	22
Blair, N. H., to Groveton, N. H.	24½
South Berwick, Me., to Madison, N. H.	22
Springfield, Mass., to Wilder, Vt.	22
Norwich, Vt., to Newport, Vt.	24½
Sherbrooke, Que., to Rochester, N. H.	22
Swanton, Vt., to Danville, Vt.	24½
Rindgemere, N. H., to East Buskirk, N. Y.	22
Johnsonville, N. Y., to Rotterdam Jct., N. Y.	22

Proposed rates in cents per 100 lb.

Reason—Proposed rates are fairly comparable with rates from York, Penn.

23549. **Limestone, unburnt, ground or pulverized**, carloads, minimum weight 50,000 lb., from Grove, Frederick, Security, Md., Engle, Martinsburg, Charles Town, W. Va., Winchester, Cedar Creek, Strasburg, Va., district to Arlington, Md., $1.40 per net ton. (Present rate, 9c per 100 lb.) Reason—Proposed rates are comparable with rates to Fulton, Westport, Md., etc.

23550. **Gravel and sand**, N.O.I.B.N., in open cars, except blast, engine, foundry, glass, molding, quartz, silex and silica, carloads (See Note 2), from Sherburne, N. Y. Rates per net ton:

To	Prop.	Pres.
Earlville to Sangerfield, N. Y.	60	65
Waterville to Richfield Jct., N. Y.	60	75
Bridgewater to East Winfield, N. Y.	60	83
Cedarville to Richfield Springs, N. Y.	70	65
Clayville to Chadwick, N. Y.	60	75

Reason—To meet motor truck competition.

23560. **Crushed stone**, carloads (See Note 2), from Glen Mills, Penn., to Burlington, N. J., $1.05, and Palatine and Husted, N. J., $1.15 per net ton. Reason—Proposed rate is comparable with rates to Prospect, Hammonton, N. J., and various.

23562. **Sand**, other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads (See Note 2), from Burnham, Penn., to Pennsylvania points (rates in cents per 2000 lb.):

To	Prop.	Pres.	To	Prop.	Pres.
Steelton	135	.....	Reading	170	.....
Harrisburg	125	.....	St. Clair	180	240
Minersville	195	240	Locust Summit	170	.....
Excelsior	160	.....	St. Nichols	180	.....
Natalie	170	240			

Reason—Proposed rates are fairly comparable with rates on like commodities for like distances, services and conditions.

M-1417. **Crushed stone**, carloads (See Note 2), from Bethlehem, Penn., to Trevose, Penn., Reading company delivery, $1.10 per net ton. Reason—To meet motor truck competition.

M-1418. **Crushed stone and screenings**, carloads (See Note 2), from Cavetown, Md., to Hancock, Md., and from Martinsburg, W. Va., to Hancock, W. Va., 70c per net ton, to apply in five-car lots and to expire December 31, 1930.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

19652. **Poultry grit and sand**, manufactured from mica or limestone, minimum weight 40,000 lb., from Warren, N. H., to Pittsfield, N. H. Present rate, 17½c; proposed, 9c. Reason—To grant shippers a commodity rate comparable with other commodity rates now published.

19653. **Broken, ground or unburnt limestone**, from North Pownal, Vt., to Epsom, Pittsfield and Short Falls, N. H. Present rate, 22c; proposed, 11c. Reason—To grant shippers a commodity rate comparable with other commodity rates now published.

19548. **Crushed stone**, from Actonvale, Que., to Enosburg Falls, Vt. Proposed rate, 9¼c. Reason—Same as applicable locally between points in Quebec.

SOUTHERN FREIGHT ASSOCIATION DOCKET

50318. **Phosphate rock**, from Mount Pleasant-Centreville, Tenn., district to Alma and Hemlock, Mich. It is proposed to establish the following reduced rates on phosphate rock, crude lump or crude ground, carloads, as described in and subject to minimum weight prescribed in L. & N. R. R., I. C. C. 15803, from stations on the N. C. & St. L. Ry. and L. & N. R. R. in the Mount Pleasant-Centreville district as shown in L. & N. R. R., I. C. C. A15803, to Alma, Mich., 721c; Hemlock, Mich., 691c per net ton. The proposed rates reflect Plymouth, Mich., combination.

50377. **Crushed limestone**, from Riverton, Va., to Rosslyn, Va. Lowest combination now applies. Proposed rate on crushed limestone, carloads (See Note 3), from Riverton, Va., to Rosslyn, Va., 90c per net ton, same as in effect to Washington, D. C.

SOUTHWESTERN FREIGHT BUREAU DOCKET

20131. **Gravel or stone**, from Columbia, S. C., to Wilson (Ellsworth county), Kan. To establish the following rates in cents per 100 lb. on gravel or stone, L. C. L., from Columbia, S. C., to Wilson (Ellsworth county), Kan.: Rates: See descriptions—C, 100½c; D. 109½c. Explanation of descriptions: "C"—Gravel or stone, rough, not further finished than sawed or cut, packed or not packed, L. C. L. "D"—Gravel or stone, hammered, finished or dressed, boxed or crated or with the finished surfaces protected by boxing or crating, L. C. L. Shippers have called attention to the discrepancies now existing between the rates published by the A. C. L. R. R. and those published by the Southern Ry., and it is desired to meet the action taken by the Southern Ry. and are therefore suggesting for application in connection with the A. C. L. R. R. the same rates as at present published in connection with Southern Ry.

20169. **Silica rock**, from St. Clair, Mo., to Hannibal, Joplin and Kansas City, Mo. To establish a rate of 9c per 100 lb. to Hannibal, Mo., and 12c per 100 lb. to Joplin and Kansas City, Mo., on silica rock, crushed, carloads, minimum weight 60,000 lb., from St. Clair, Mo.

Shipper has requested the establishment of a reasonable basis of rates to the stations named. The proposed rates are 9½% of the 13535 first class rates.

ILLINOIS FREIGHT ASSOCIATION DOCKET

2913. **Sand and gravel**, carloads, from Muscatine, Iowa, to Kenosha, Wis. Rates per net ton. Present, $1.80; proposed, $1.30.

5335. **Sand and gravel**, carloads (See Note 1):

From Forreston	Pres.	Prop.		Pres.	Prop.
Evarts, Ill.	75	60	Alworth, Ill.	75	60
Seward, Ill.	75	60	Rockford, Ill.	75	75
From McCook					
Evarts, Ill.	113	98	Alworth, Ill.	113	98
Seward, Ill.	113	98	Rockford, Ill.	113	98
From Hillside					
Evarts, Ill.	100	85	Alworth, Ill.	100	85
Seward, Ill.	100	85	Rockford, Ill.	68	68
From Coleman, Munger					
Evarts, Ill.	88	73	Alworth, Ill.	88	73
Seward, Ill.	88	73	Rockford, Ill.	68	68

5582A. **Sand, molding** (See Note 3), but not less than 40,000 lb., from Greenville, Lutz Spur, Mulberry Grove and Bear Creek, Ill., to Beloit, Wis. Rates per net ton. Present, $2.50; proposed, $2.

5589A. **Sand or gravel** (See Note 2), from Spaulding and Munger, Ill., to Cardiff, Campus, Emington and Saunemin, Ill. Present rate, $1.51; proposed, $1.01 per ton.

5590. **Wastestone, viz., rip rap, broken stone,**

chips and spauls (See Note 1), from Bosley Dell, Ill., to Peoria, Ill. Present rate, class; proposed, $1.74 per ton.

5596. **Crushed stone,** carloads (See Note 1), from Thornton, Ill., to Rockford, Ill. Present rate, class; proposed, $1.20 per ton.

5605. **Crushed stone,** carloads, from Danville, Ill., to Joliet, Ill. Present rate, $1.89; proposed, $1.39.

5644. **Sand and gravel,** carloads (See Note 1), from Metropolis, Ill., to Dahlgren, Ill. Present rates, class; proposed, $1.35 per net ton.

5646. **Stone, crushed** (See Note 3), but not less than 60,000 lb., from Joliet, Ill., to Marshall, Ill. Present rate, 14c per 100 lb.; proposed, 126c per net ton.

2977-D. **Limestone, broken, crushed or ground,** carloads, minimum weight 10% less than the marked capacity of car but not less than 40,000 lb., from Mosher and Ste. Genevieve, Mo., to stations in southern Illinois.

To representative points—	Pres.	Prop.
Caseyville, Ill.	$1.50	$1.35
Sandoval, Ill.	1.34	1.26
Benton, Ill.	1.50	1.26
Waltonville, Ill.	1.50	1.26
Belleville, Ill.	1.50	1.12
Eldorado (I. C. R. R.), Ill.	1.50	1.39
Nason, Ill.	1.50	1.38
Eldorado (L. & N. R. R.), Ill.	1.50	1.44
Salem, Ill.	.90	.90
Murphysboro, Ill.	1.50	1.12
Millstadt, Ill.	1.50	1.25
Germantown, Ill.	1.50	1.26
Pinckneyville, Ill.	1.50	1.12

4893-A. **Sand, core,** carloads (See Note 3), from Greenwich, Kankakee, Van's Siding and West Kankakee, Ill., to Aurora, Ill. Rates per net ton. Present, $1.39; proposed, $1.25.

5654. **Sand and gravel** (See Note 3), but not less than 40,000 lb. will apply, from Ottawa, Ill. Rates per net ton:

To—	Pres.	Prop.
Leeds, Ill.	$1.51	$0.95
Dana, Ill.	1.51	.95
Rutland, Ill.	1.30	.90
Dwight, Ill.	1.39	.95

4635. **Washed or processed silica sand and crude silica sand,** carloads, from Millington, Ottawa, Sheridan, Wedron, Oregon and Utica, Ill., to Brookport, Cairo, Joppa, Metropolis, Mounds, Thebes, Thebes Transfer, Ill., Evansville, Jeffersonville, New Albany, Ind., and Cincinnati, O., when far beyond, as provided in Agent Jones 104-P, I. C. C. 2100, rates per net ton. Present, $2.75; proposed, $2.40 on washed or processed silica sand and $2 on crude silica sand.

WESTERN TRUNK LINE DOCKET

7249. **Sand and gravel,** carloads (See Note 3), but in no case shall the minimum weight be less than 40,000 lb. Rates from Millington, Oregon, Ottawa, Sheridan, Utica, Wedron, Ill., to Atchison, Kan. Present rate, $3.10; proposed, $2.95.

1564-Z. **Stone, crushed,** carloads (See Note 3), but not less than 40,000 lb. will apply, from Dell Rapids, S. D., to Beresford, S. D. Present rate, $1.40; proposed, $1.30.

2051-N-N, Sup. 1. **Stone, crushed,** carloads (See Note 3), but in no case shall the minimum weight be less than 40,000 lb., from Dell Rapids, S. D., to Lawton, Moville, Kingsley, Pierson, Correctionville, Cushing, Holstein, Galva, Schaller and Early, Ia. Present rates, 8½c; proposed, 7½c per 100 lb.

1200-A. **Sand and gravel,** carloads (See Note 3), from Fairbury, Neb.

To	Mileage	Pres.	Prop.
Norton, Kan.	162.3	160	135
Dellvale, Kan.	171.3	160	140
Clayton, Kan.	179.3	170	140
Jennings, Kan.	186.6	170	145
Dresden, Kan.	195.0	170	150
Selden, Kan.	204.5	180	160
Rexford, Kan.	215.1	180	160
Breton, Kan.	219.5	180	160
Gem, Kan.	224.1	180	160
Colby, Kan.	232.1	190	170

Oyster Shell Rates to Be Adjusted

THE Interstate Commerce Commission, by division 3, in I. and S. No. 3205, oyster shells, to, from, and between points in southern territory, and No. 21895, Atlantic Shell Co., Inc., et al. vs. Ahnapee and Western et al., has found not justified proposed changes in rates and relationships on oyster shells, crushed and ground or not crushed or ground, from south Atlantic and Gulf ports to Ohio and Mississippi river crossings, Mississippi valley points and southeastern points. The finding, however, is without prejudice to the filing of rates in conformity with views expressed in the report. Rates on the same commodities from south Atlantic ports to Arkansas and central and western trunk line territories have been found unreasonable and unduly prejudicial.

The schedules in the suspension proceedings proposed changes from south Atlantic ports, Wilmington, N. C., to Jacksonville, Fla., inclusive, and from the Gulf ports, Apalachicola, Fla., to New Orleans, La., inclusive, to the river crossings, to the Mississippi valley freight territory and the southeast. The formal complaint alleged the rates from the south Atlantic ports to central and western trunk line points and Arkansas were unreasonable and unduly preferential of the Gulf ports.

The commission, in its findings, laid down formulas for making rates, in sums per net ton but did not issue an order. It said that the carriers were expected to establish the rates indicated within 120 days from the service of the order. If this is not done, the commission, the report says, will consider the entry of an appropriate order. The findings, other than the formal one finding the changes not justified, follow:

"We further find that the rates assailed in No. 21895 will for the future be, for distances of 300 miles and over, unreasonable to the extent that they exceed, to points to which through one-factor first class rates are in effect from south Atlantic ports, rates made 15% of the corresponding first class rates.

"We further find that the rates from south Atlantic ports assailed in No. 21895 to destinations to which through one-factor, first class rates are in effect from south Atlantic and Gulf ports will for the future be, for distances of 300 miles and over, unduly prejudicial to Atlantic ports, Charleston to Jacksonville, inclusive, and unduly preferential of Gulf ports, Apalachicola to New Orleans, inclusive, to the extent that the rates from such south Atlantic ports to such destinations bear a relationship to those contemporaneously effective from such Gulf ports to the same destinations more favorable to the latter ports than would result from applying from both south Atlantic and Gulf ports rates made 15% of the first class rates.

"We further find that to destinations north and west of Illinois territory to which no through one-factor first class rates are in effect from south Atlantic ports, the rates assailed in No. 21895 have not been shown to be unreasonable, but that rates from south Atlantic ports, Charleston to Jacksonville, inclusive, to such destinations are, and for the future will be, unduly prejudicial to such south Atlantic ports and unduly preferential of Gulf ports, Apalachicola to New Orleans, inclusive, to the extent that the rates from the south Atlantic ports to such destinations exceed the rates from the Gulf ports to such destinations by more than 10 cents per net ton for each 25 miles, or fraction thereof, by which the distances from the south Atlantic ports to such destinations exceed the distances from the Gulf ports to such destinations.

"Nothing in our findings herein should be construed as prohibiting reasonable groupings of origins or destinations provided that each rate to or from a group reflects a fair average of the rates and differences in rates which would otherwise be permitted under our findings herein to or from the individual points in the group.

"We further find that in applying the provisions of findings 4 and 5 above, distances should be determined by the shortest routes over which carload traffic can be moved without transfer of lading, and that if rates be published in amounts per ton, amounts ending in figures between 1 and 4, inclusive, should be resolved to the next lowest amount ending in 0; and that amounts ending in figures between 5 and 9, inclusive, should be resolved to the next highest amount ending in 0; that rates from all origins should be made subject to a minimum of 50,000 lbs., and that nothing in these findings should be construed as authorizing any fourth-section departures, or as approving group rates which are higher to intermediate groups than to more distant groups over direct routes."—*The Traffic World.*

Kansas Sand and Gravel Rate Order Canceled

CANCELLATION of its previous order for reduced rates on sand, gravel, chats and other road building materials was announced recently by the Kansas Public Service Commission. The revocation of the order permits the railroads to install, on one-day notice, the schedules proposed in the Southwestern case now before the Interstate Commerce Commission.

The reductions proposed are about 9 per cent of the present rates, as compared to the 19 per cent reductions ordered by the Commission. The saving to shippers will be about $100,000 a year, according to Charles E. Steiger, attorney for the commission.—*Topeka* (Kan.) *Capital.*

I. C. C. Reports

3379. Furnace or Foundry Limestone. To give itself more time for the consideration of the papers filed in I. and S. No. 3379, furnace or foundry limestone from Hillsville, Shaw Junction, and Walford, Penn., to Youngstown, Ohio, and adjacent points, particularly the request of the protestants for further postponement of the effective date of its order, the Interstate Commerce Commission has postponed the effective date of the order from April 30 to June 11. The order vacates the order of suspension and discontinues the proceeding.

Foreign Abstracts and Patent Review

Portland Cement and Pozzolanas. A. Poulsen states that the defects of the portland cement, which is otherwise excellent, and also the weathering of concrete and the possibility of disintegration by certain acids and salts, by sea water, carbonated water, and even pure spring water, *all originate* from the action of the excess hydrate of lime, which is liberated from the cement in its hydration. The lime, which is chemically more active than the alkalies, enters into chemical combinations with all kinds of acids and salts, and therefore also with the alkali-soluble silicic acid contained in the pozzolanas. For this reason marine concrete work made by the Romans 2000 years ago, of Italian pozzolanas and Rhineland trass, exists today.

A "fat" pozzolana contains as soluble constituents primarily such hydraulic factors as silicic acid, alumina compounds, and iron compounds. Whereas, Holland and Germany have employed trass for a long time as an addition to lime and to portland cement, Denmark has used very little trass. They are using a pozzolana which 40 years ago the author discovered in the Moler (a peat-loam) which is a tertiary deposit of microscopic (diatoms) plants. This Moler contains from ⅔ to ¾ silicic acid, but also other hydraulic factors. The alkali soluble part of the raw Moler is more than 50% and in sintering increases to more than 66%, whereas trass has a soluble portion of only 20 to 30%.

At the Aalborg cement plant 75 weight parts of portland clinker has been ground with 25 weight parts of Moler into a Moler cement ever since the year 1910. The Moler is used either raw or burned; if burned, it gives the cement a beautiful brick-red color, and greater strength than obtained with the gray Moler. The accompanying table gives further data.—*Tonindustrie-Zeitung* (1930) **54,** 10, pp. 161-162.

QUANTITY AND PER CENT BY WEIGHT

	Soluble SiO_2 *a*	Soluble $Al_2O_3+F_2O_3$ *b*	Soluble CaO *c*	Other materials, sand, etc. *d*	Index in per cent $\frac{a+b}{c}$ *e*	Strength in per cent *f*
Portland cement	22½	8½	66	3	47	100
Moler cement (75+25)	31¼	10¾	49½	8½	85	140
Trass mixture (58+42)	2½	13	39½	26	87	75
Trass mixture (74+26)	21¾	11¼	49½	17½	67	90
Trass mixture (83⅓+16⅔)	22	10¼	55½	12¼	58	<100
Iron portland cement	24¾	12	58½	4¾	63	>100

Nozzle Bank or Valve for Slurry. The common discharge valve of cement slurry tanks is subjected to considerable wear. Therefore, the discharge of the slurry from the tank is regulated according to this patent by means of a number of nozzles of different diameters located upon a disc, which may be rotated so that a nozzle of any desired and suitable diameter can be placed for the discharge. Counterweights may be employed to permit an easy raising of the nozzle bank. German Patent No. 488,568. *Tonindustrie-Zeitung* (1930) **54,** 14, p. 228.

Silicate Material Versus Trass for Cement and Lime. R. Meuser and Dr. Luftschitz have a controversy on the subject of the use of silicate material as compared to trass in the preparation of mortars for building dams across valleys. The discussion centers around strength relative to water content and change in volume of the mortar.—*Zement* (1929) **18,** 49, pp. 1411-1415.

Testing of Plastic Mortar. Dr. Haegermann dealt with this subject at the annual meeting of the Association of German Portland Cement Producers, on September 3, 1929. Attempts have been made to replace the earth-damp mortar employed in testing portland cement, with plastic mortar, and to replace the tensile strength with the flexural strength test. The report given by Feret and Ros at Amsterdam in 1927 is an example. The work of these two men is reviewed and quoted. Then Haegermann reviews the results of the experiments that have been made to develop a testing method using plastic mortar. He includes the work done by Gary in 1903, and later by Schuele, whose recommended specifications of the years 1910 to 1913 relative to method of testing, is quoted verbatim. Further experiments were made in 1914 under the direction of Gary, and also by Burchartz, who is quoted.

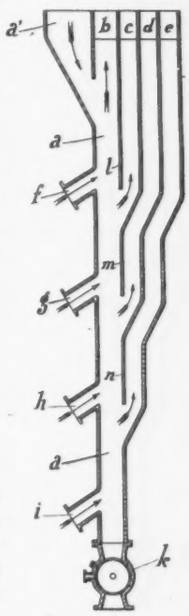
Following the work of Ros in 1927, the author attempted to eliminate the last sources of error from the method for testing plastic mortars. He employed a standard sand having the mixed granulation 1.02 to 1.50 mm. and 0.10 to 0.30 mm., even though the International Society for Testing Materials recommended a sand of the following granulation: 0.5 to 1.0 mm., 1.0 to 1.5 mm., 1.5 to 2.0 mm. In preparing the plastic mortar, 600 gram of cement and 360 gram of fine sand are well mixed for one minute; then 1440 gram of coarse sand is added. After mixing for another minute, from 12 to 15% water is added. The author describes in detail the preparation of the specimens, and the method used in determining the correct amount of water for the mortar.

It cannot yet be stated whether this method can stand, since experience by different persons must first be obtained.—*Tonindustrie-Zeitung* (1930) **54,** 18, pp. 296-299. Also *Zement* 1930, pp. 167-174.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Separator. A device for separating coal from heavier minerals, such as slate, employs a vertical column with openings at the side through which water-currents are admitted. The coal is raised by the current while the heavier slate sinks. With a plurality of currents the coal is given a repeated washing and light particles carried down in the wake of heavier particles in the first washing are afterwards removed, according to the inventor.



Separator

(While the device is patented as a coal washer, it is a modified form of a well known classifier, used for making a number of sizes.)—*C. Marchant,* U. S. No. 1,729,545.

Wallboard with Protected Edges. This invention has for its object to provide simple and effective means incorporated in wall boards to meet the different conditions of abuse during handling and shipping and to provide a board wherein adequate reinforcement and protection of the longitudinal edges is assured.

The wallboard has a rigid channel shaped


Wallboard with protected edges

transversely divisible reinforcing strip overlapping opposite edges.—*Curry O. Walper, Assignor to United States Gypsum Co.,* U. S. Patent No. 1,747,339.

Recent German Research on Cement

Based on Reports of the Recent General Meeting of the German Portland Cement Manufacturers' Association

Reviewed by Dr. C. R. Platzmann
Berlin, Germany

THE ANNUAL GENERAL MEETING of the Association of German Portland Cement Manufacturers, which was held in the latter part of March, offered, besides the disposal of the internal affairs of the association, a wealth of highly interesting scientific and technical addresses upon which will be reported briefly and comprehensively in the following paragraphs because of their general importance to cement research and mill operation.

Sintering Raw Materials of Cement

The series of addresses was opened by Dr. Haegermann, the director of the laboratory of the association, who in supplementing the labors of the kiln commission of the association has started extensive experiments on the sintering of raw portland cement material. In this connection it was natural that the Seger cones employed for ceramic purposes be used. Since, however, the fusion point of the portland cement is comparatively high and the temperatures between 1300 and 1500 deg. C. are principally of interest here, these experiments were done without results. The heating curves compiled showed different distinct breaks, namely, at:

1. Expulsion of the mechanically added water.
2. Discharge of chemically combined water.
3. Escape of the carbonic acid.
4. Start of the exothermic reaction.

If heating was interrupted or the kiln shut down, there resulted another break at a point of solidification fixing the sintering, since according to W. Dyckerhoff the sintering represents the complete fusion of a portion of the mass. This sintering point was between 1275 and 1295 deg. C.

Experiments for making use of shrinkage as a criterion for the finish burn of a cement failed, as well as those for evaluating in this way the determination of the density.

Then the pulverized raw materials were heated for 20 minutes to temperatures of 1325, 1375, 1425 and 1475 deg. C., and the content of free lime in the sintered specimens was determined according to Emley's method, since it was to be assumed that a well sintered clinker does not contain free lime. This method proceeded without results, just as the application of the boiling test, since apparently fineness in grinding and the chemical nature of the raw materials determine the sintering ability.

Upon the basis of this assumption, if, for example, a "raw flour" was divided into two fractions by using a screen of 10,000 mesh per sq. cm., it was shown after the burn that the fine screened material contained no free lime, but the coarser material more than 3%. Therefore, the coarser a raw flour is ground, the longer must it be heated at the sintering temperature if a finish burned clinker is to result. Dr. Haegermann, who by the way is continuing his experiments, believes that the MgO content also exerts determining influence upon the quantity of the free lime.

Hydrates of Tricalcium-Aluminate

The Director of the Kaiser William Institute of Silicate Research, Prof. Dr. Eitel, reported concerning labors of Prof. Dr. T. Thorwaldson of the Canadian University, Satskatchewan, who has assigned the sulphate disintegration of cements to the hydration of the tricalcium-aluminate. A series of the hydrates of the $3Ca \cdot Al_2O_3$, especially the regularly crystallizing hexahydrate ($3CaO \cdot Al_2O_3 \cdot 6H_2O$) possess a far reaching resistability to the disintegrating influence of sulphate solutions. He obtained a considerably increased stability to sulphur when he treated set cement with water vapors under pressure, and believes he can trace this phenomenon on one hand back to this, that hereby greater quantities of the hexahydrate are formed; on the other hand, he believes that with suitable additives, the hydrate of lime freed in the setting of the cement is combined with them so rapidly that a direct reaction with the sulphate solutions is prevented.

Thermo-Chemistry of Cement

Prof. Dr. W. A. Roth of the Higher Technical School of Brunswick treated in his address new methods of research in the thermo-chemistry of cement, in which he started from the consideration that release of heat or absorption of heat are the characteristic indications of the start of chemical reactions, and that by measuring the first, one can conclude concerning the manner of this reaction. Due to the difficulty of carrying out direct measurements, it is intelligible why this field of cement research has thus far been neglected. The calorimetric method worked out by Roth for application to iron ores, carbonates and silicates can be used for cement only with difficulties, because the reaction of the formation of cement takes place, relatively, slowly. When raw flour is mixed with paraffin as a fuel, it appears possible to burn this mixture in the calorimetric bomb with compressed oxygen, provided water is kept out, on account of the danger of an explosive gas, and then to determine the reaction products.

The second, indirect method is to dissolve the raw flour as well as the clinker in the same acid and to measure various heat zones. The only acid that can be considered in this case is a mixture of hydrofluoric and hydrochloric acid, since clay does not dissolve in the ordinary acids. Disintegration of the vessels is avoided if they are made of gold with fine rubber packing. After Roth had now available a usable apparatus, he intended to apply it to cement research, and hopes to be able to determine both the heat of formation and the heat of setting in a dependable manner.

Fineness of Grinding in Relation to Strength of Cement

In connection with this address, there was great interest in the address of Prof. Dr. H. Kuehl concerning the influence of the fineness upon the properties and strength of the portland cements. Kuehl starts with the assumption that the granular composition of a cement is the most favorable when it is analogous to the modulus of fineness curve established by Fuller for the much coarser sand and gravel granulations. He worked with two different cements, of which the one was ground in the plant by aid of air separation, whereas the other was pulverized in a laboratory mill. By use of the Gonell screening apparatus, each cement was divided into seven different fine fractions, which differed from each other in respect to granular size, each by 10 micro-mm. (1/100 mm.). Since such screening or separation requires very much time, the tests for strengths had to be confined to the small scale method developed by Kuehl. When the values obtained with it are brought into relationship with the total surface area of the granules, it is shown that the figure increases with an increasing total surface, but that it increases in no case proportionally. When the granulation goes below 20 micro-mm. (2/100 mm.) the strength expressed by the figure no longer increases noteworthily.

On the other hand, when mixing the coarsest and finest granulations, the same value results as was obtained for the cement when not separated, even though the total surface was considerably greater. To a proportionally very fine cement, even though of mixed granulation, can be mixed very coarse portions up to 30% without the cement suffering a decrease in strength.

Connecting to these experimental results, Kuehl sees two possibilities within the range of economy of producing cements of high strength. The first consists in the creation of a uniform medium granule which is not too fine, whereas in the second case very fine granules must be mixed with coarser particles.

Importance of Complex Compounds

Prof. Dr. F. Krauss called the attention of the meeting to an entirely new field when he reported on views concerning compounds of higher order and their significance to the synthesis of the substances present in the portland cement. Krauss determined quite correctly that in the field of the portland cement chemistry, but especially in the setting up of formulas for the constitution of cements, fundamental chemical laws have frequently found no consideration. Because of this, frequently one held as a result to the normal valence rules, and improbable and partly even impossible constructions have come into existence. There are therefore a large number of inorganic chemical compounds which fit in no manner into the valence theory. It is the merit of Krauss to have pointed in this connection anew to the famous theories of the sub-valences of Werner, since only these admit of satisfying formulations for complex compounds, of which the cement is one. The application of these theories to the synthesis of the silicates, and in particular to that of the calcium silicates, was the subject of the address. The Werner sub-valance theory has been confirmed by the views of Pfeiffer and by the results of x-rayographic investigations.

Effect of Storage on Cement

In 1927 Gensbaur made public sensation-arousing test results, according to which cements which had been tested according to standard specifications for 28-day combined storage, showed after a further storage in water considerable decreases in strengths, which he regarded as an indication of deficient consistency. Prof. Burchartz of the Materials Testing Bureau Berlin-Dahlem furnished in his address a contribution for evaluating Kl-storage for practical uses. He employed for his tests five different cements, among which was one iron portland and one blast furnace cement, resulting as follows:

a. German standard tests.

b. Determination of tensile and compressive strengths of standard mortar specimens after (*1*) 7 and 28 days, and 28 days' storage in water; (*2*) 28 days' and 2 months' combined storage; (*3*) 28 days' combined storage, and 2 days' water storage; (*4*) 28 days' combined storage and 1 month water storage.

c. Determination of the compressive strengths of concrete mixes 1:4 and 1:6 after (*1*) 28 days' combined storage; (*2*) 28 days' combined storage and 2 days' water storage; (*3*) 28 days' combined storage and 1 month water storage.

d. Determination of the weight of all test specimens of the kinds of storage given under *b* and *c*, in order to determine how much water is given off in combined storage and how much is absorbed again in the consequent renewed storage in water.

In regard to *d*, it was shown that the test specimens reabsorb comparatively little water. In the Kl-storage of the standard mortar specimens, it was found that the tensile and compressive strengths possessed a recurrent tendency, but that the water storage lasting only 2 days was of more significant influence. The compressive strengths of the concrete also showed in this case unimportant retrogressions, but in renewed one-month water storage no decrease in strengths could be determined. Besides, there are no regular relations between the lime content of the cements and the observed retrogressions of strengths, so that the Burchartz conclusion appears fully justified, that the behavior in Kl-storage is no measure for the behavior in its application.

As in previous years, Prof. Dr. R. Nacken of the University of Frankfurt a. M., gave again his report on the scientific investigations carried out in the last year, which dealt with the determination of the heat of formation of silicates from their oxides. The experiments of Nacken stood in close relation with the theme handled previously by Prof. Roth. He selected the indirect method and used mixtures of hydrofluoric and hydrochloric or nitric acid as solvents. Prerequisite for the successful working was in this case the rapid determination of the specific heats of the acid mixtures. The mechanics of it are based upon the weighed quantity of a supercooled fusion that generates an exactly defined volume of heat in crystallization. The specific heat of the liquid to be examined can be determined rapidly from the increase in temperature in the crystallizing of a quantity of supercooled fusion (smelt) contained in a small tube.

In consideration of the slow solubility of the silicates it was necessary to undertake the experiments with an accurately operating thermostat in which the calorimeter was located. The following tables contain the results of Nacken's experiments:

Specific heat of acid	Water value	Gram used	Rise in temperature, deg. C.	Heat of Solution per gram in cal.	Heat of Solution per molecule in cal.
		A. ∞ — $CaSiO_3$			
0.7355	150.19	0.5	0.583	437.80	50.960
			0.580	435.55	50.698
			0.584	438.55	51.047
			0.585	439.31	51.137
			Average	437.803	50.768
		B. β — $CaSiO_3$			
0.7355	150.19	0.5	0.564	423.54	49.299
			0.553	415.28	48.338
			0.562	422.04	49.124
			0.564	423.54	49.229
			0.559	419.78	48.862
			0.562	422.04	49.124
			Average	421.037	48.996
		C. $CaO + SiO_2$			
0.7355	150.19	0.5	0.903	678.11	78.931
			0.898	674.36	78.495
			0.906	680.37	79.193
			Average	677.613	78.873
		D. y — $Ca_2Si_2O_6$ crystallized			
0.7355	150.19	0.5	0.714	536.175	92.476
			0.711	533.925	92.088
			0.709	532.425	91.830
			0.728	546.690	94.288
			Average	537.304	92.671
		E. $2CaO + SiO_2$			
0.7355	150.19	0.5	1.000	759.95	129.52
			0.990	743.45	128.22
			0.993	745.70	128.61
			Average	746.70	128.78

F. Heat of formation of $Ca(OH)_2$ from $CaO + H_2O$

		1. $CaO + H_2O$ in HCl			
0.7934	170.00	0.2802 +1.0411	1.462	908.00	50.912
		2. $Ca(OH)_2$ in HCl			
0.7934	170.00	1.3213	3.209	412.88	30.59

$CaO + 2HCl = CaCl_2 + H_2O + 50.912$ cal.
$Ca(OH)_2 + 2HCl = CaCl_2 + 2H_2O + 30.59$ cal.
$CaO + H_2O = Ca(OH)_2 + 20.322$ cal.

G. Heat of Formation of Silicates from the Oxides

1. Metasilicate plus oxide ⟶ orthosilicate

Kind of silicate	Per molecule in cal.
$2CaO \cdot SiO_2$	8.004
$2SrO \cdot SiO_2$	8.296
$2BaO \cdot SiO_2$	4.980
Pb_2SiO_4	1.456

2. Orthosilicate

Kind of silicate	Heat of formation per gram in cal.	Heat of formation per molecule in kg. cal.	Crystal heat per gram in cal.	Crystal heat per molecule in cal.	Heat conversion per molecule in cal.
$2CaO \cdot SiO_2$	209.396	36.109	.....	.....	.....
$2SrO \cdot SiO_2$	123.180	32.956	.....	.....	.....
$2BaO \cdot SiO_2$	67.880	25.190	.....	.....	.....
Pb_2SiO_4	10.804	5.410	7.222	3.659	.....
		3. Metasilicate			
β — $CaSiO_3$	256.594	29.877	.....	.....	} —1.722
∞ = $CaSiO_3$	239.830	28.150	.....	.....	}
$SrSiO_3$	150.430	24.660	.....	.....	.....
$BaSiO_3$	94.580	20.209	.....	.....	.....
$PbSiO_3$	13.985	3.954	6.838	1.929	.....

Gypsum and Other Retarders

With regard to the discourses on retarders of set, as published by R. K. Meade and E. E. Berger in ROCK PRODUCTS, 1928, the address of Dr. L. Forsen (Finland) on the chemical action of gypsum and other retarders of the period set of portland cement clinker should especially interest American readers. The investigations of Forsen, who tested the action of retarders only upon pure clinker flour, characterized these results always as pure chemical processes, are summarized in the following:

(*1*) The rapid set of the pure clinker flour is based upon the hydrolysis of the unstable $3CaO \cdot Al_2O_3$ and takes place according to the following equation: $3CaO \cdot Al_2O_3 + 5H_2O = 2Al(OH)_3 + 3CaO(OH)_2$ (*1*)

(*2*) Due to the retarder effecting a slow setting, spherolytic crystals of complex compounds are formed:

$$3CaO \cdot Al_2O_3 + CaX_2 + 10H_2O = 2\left[\begin{array}{c} OH \\ Al(\text{---}Ca)_2 \\ OH \\ \hline (H_2O)_2 \end{array}\right] \frac{(OH)_2}{X} \quad (2)$$

X represents in this equation the acid anion (SO_4, NO_3, etc.). Due to the formation of complex compounds, the hydrolytic decomposition of the $3CaO \cdot Al_2O_3$ is held back, since this retarding of the rapidity of the reaction is based upon the lower solubility of the aluminate in calcium salt solutions. If greater quantities of the retarder are added, a renewed reversal in the rapid set takes place, since greater quantities of spherolytic crystals are formed. This is also the cause of the so-called false set.

(*3*) With greater concentrations of this kind of retarders an appearance of unsoundness similar to the unsound action of gypsum sets in, since the tetrol compounds enter into hexol compounds, which is illustrated by the following equation:

$$2\left[\begin{array}{c} OH \\ Al(\text{---}Ca)_2 \\ OH \\ \hline (H_2O)_2 \end{array}\right] (OH)_3 + 3CaX_2 = 2\left[\begin{array}{c} OH \\ Al(\text{---}Ca)_3 \\ OH \end{array}\right] X_3 + 4H_2O + Ca(OH)_2 \quad (3)$$

(*4*) Compared to this, the unsound action of lime is based upon the formation of easily soluble calcium hexol aluminum hydroxide compounds according to

$$\left[\begin{array}{c} OH \\ Al(\text{---}Ca)_2 \\ OH \\ \hline (H_2O)_2 \end{array}\right] (OH)_3 + Ca(OH)_2 = \left[\begin{array}{c} OH \\ Al(\text{---}Ca)_3 \\ OH \end{array}\right] (OH)_3 + 2H_2O \quad (4)$$

If this reaction takes place rapidly, as for example by the use of $AlCl_3$, a false rapid set starts in also, which, however, is not based upon hydrolysis, but upon the formation of spherolites.

Disintegration of Concrete in Aggressive Waters

Prof. O. Graf spoke concerning the protection of concrete against aggressive waters and treated primarily the influence of $MgCl_2$ and $MgSO_4$ upon the various kinds of cement. He recommended the use of as dense a concrete as possible in order to protect it against aggressive action.

Application of Modulus Fineness of Aggregates

Then followed an address by Dr. A. Hummel on the working out of screen analyses and the Abrams modulus of fineness of aggregates. The explanations of Hummel were especially interesting and new to German listeners in so far as they ascertained that the degree of density of an aggregate does not need to be in any manner a measure of its strength, since the screen analyses of the aggregate frequently give a wrong picture. Similarly, in coarse aggregates, the granular composition is frequently entirely of subordinate significance. This assertion is true occasionally for sand. Upon the basis of his test, Hummel maintains, therefore, that the modulus of fineness worked out by Dr. D. A. Abrams is a dependable criterion, since in this case all aggregate materials of the same modulus of fineness with the same requirement of water have also the same strength.

Improvements in Mill Practice

The series of technical addresses found its conclusion with the discussion of A. B. Heller on improvements in cement milling. Helbig reports on modern air separation, which he recommends to be fitted into the grinding process as follows: The material coming from the first mill is divided in the coarse separator into coarse flour (grits) and fine flour; the coarse flour is returned to the first mill and the fine flour enters into a second separator which eliminates the finest cement flour on the principle of closed-circuit separation. The fine flour thus removed of dust (cement) is then ground in the last mill to the fineness of cement. With a residue of 6% to 7% upon the 4900 mesh screen (metric system) an increase in output of the mill of from 10.5 to 13.5 tons (metric) was had, and with a residue of 0.5%, an increase from 7.5 to 10 tons is said to be obtained; whereas at the same time the power consumption decreases from 51.7 to 40.2 kw. per hour and ton.

The efficiency of the multi-chamber mill when handling very fine cements drops below the economic limit and the material being ground starts to heat considerably. At a rate of fineness of 0.5-9% residue on the 4900-mesh metric screen, the finest flour in the multi-chamber mill acts as a pad. A cement measured with the Gonnell apparatus consisted of 55.8% of 0-10 micro-mm. granules, 43.4% of 10-20, and of only 0.8% of larger than 20 micro-mm. The granules of 10 micro-mm. would pass through a hypothetical screen of 90,000 metric mesh.

Tests showed that such a fine cement can be produced economically only with a correctly designed air-separating process. A new closed-circuit mill was described in which the fine flour, which acts as a pad, is removed, while the greater portion of the grit is returned to the mill from the grit tube between the air separator and mill.

According to experience, a fineness of 10% residue on the 4900-mesh screen is the most economical, as long as the grinding process is not divided into two parts. Fine flour of correct granulation can be attained by adjustment of an air separator, and not as well by any system of screens or perforated plates.

Old California Lime Operation to Be Revived

A REVIVAL of the lime industry in the Cienega district, California, is marked by the reopening of the old San Benito lime kilns by A. E. Hamilton and associates, who have begun operations, and will spend a considerable amount of money in installing a grinding plant and other machinery and equipment.

The two kilns of the property are in good condition and the company will begin burning lime soon. The kilns have a capacity of 3850 bbl. of lime per month.

The grinding plant to be installed shortly will be for the manufacture of "whiting" and "pebble dash."

Seven men are now at work on the property and the plant will give employment to fifteen or twenty men later on.

Mr. Hamilton formerly operated the dolomite quarries at the San Benito Vineyards, hauling the dolomite to Hollister where a crusher and loading plant was maintained. San Francisco, San Jose and some Hollister capital is interested in his new venture.—*Hollister* (Calif.) *Free Lance.*

Salida, Colo., Limestone Operations Enlarged

MACHINERY valued at $125,000 is ordered and is on the way to be installed at the Burton limestone quarry at Monarch, Colo., near Salida. A crusher, a 2¼-yd. shovel, a third compressor, a tool sharpening plant, and two 10-ton trucks are among the equipment expected shortly. The Colorado Fuel and Iron Co. has invested over $175,000 in the Burton quarry.

About 24 men are now working at the quarry, the entire output of which is being sent to the C. F. and I. plant in Pueblo. Some 525 tons of rock are being shipped daily, but it is thought that 1,000 tons will be the usual day's run when the new equipment is installed. Six houses are being built to house additional families of employes.—*Pueblo* (Colo.) *Star-Journal.*

Domestic Graphite Sold in 1929

THE TOTAL QUANTITY of graphite sold by graphite miners in the United States in 1929 and its value were considerably larger than the corresponding figures for 1928, according to a statement by the United States Bureau of Mines, Department of Commerce. The sales of natural graphite by producers in 1929 were 6458 tons, valued at $310,891, an increase of 847 tons, or 15% in quantity, and $13,798, or 5% in value. The increase in quantity of sales was chiefly in the amorphous variety. The total sales include 3555 tons of amorphous and 2903 tons of crystalline graphite. This was an increase of 561 tons, or 19%, in the former and 286 tons (573,110 lb.), or 11%, in the latter. The value of the amorphous variety increased $3330, or 8%, and the crystalline variety increased $10,468, or 4%, compared with 1928. The quantity and value of crystalline graphite sold in 1929 was the largest since 1920. Statistics of sales of graphite were collected in co-operation with the Geological Surveys of Alabama, Michigan and Texas.

The states reporting the sale or use of graphite by the miner in 1929 were Alabama, Michigan, Nevada, Rhode Island and Texas. Texas was the leading state in the sales of crystalline graphite in 1929.

The foregoing figures represent the sales or shipments of graphite. The production figures are somewhat different. Only one amorphous graphite mine was in operation in 1929, that of the Carson Black Lead Co. in Nevada. Two others used or sold material from stock mined previously. Production of crystalline graphite in 1929 was 5,425,-200 lb., compared with 5,500,000 lb. in 1928.

The imports of graphite in 1929 amounted to 24,072 short tons, valued at $1,066,834, compared with 17,569 short tons, valued at $801,559, in 1928, an increase of 37% in quantity and 33% in value.

Lynford E. Geer

LYNFORD E. GEER, one of the most potent characters in cement, sand and gravel and shipping circles in the Great Lakes region, died in Chicago, May 10.

Mr. Geer, or "Colonel Geer" as he was affectionately known among his intimates, was one of the organizers of the Manitowoc Portland Cement Co. in June, 1923, and from that time until the recent consolidation of the Manitowoc company with the Medusa Portland Cement Co., Mr. Geer served as vice-president and a director of the former concern. He had also been vice-president and director of the Newaygo Portland Cement Co. from 1923 until its recent consolidation with Medusa. He was a director and member of the executive committee of the Medusa Portland Cement Co. at the time of his death and was known in the organization as one of its most virile and progressive members.

In 1926 he became secretary and treasurer of the Cement Transit Co., operating cement carrying steamers on the lakes, and at the time of his death he was vice-president of that concern. For many years he had been a director and officer of all of the following companies: American Sand and Gravel Co., Chicago; Great Lakes Sand Co.; Manitowoc Shipbuilding Corp.; Manitowoc Engineering Co.; Manitowoc Foundry Co.; Rockport Steamship Co. and the Goodrich Transit Co. of Chicago.

After residing in Manitowoc, Wis., for twenty years, Mr. Geer moved to Chicago five years ago in order to take personal charge of the rapidly growing business of the above concerns in this vicinity.

"Colonel" Geer was a man of extremely likeable and magnetic personality. He was

Lynford E. Greer

a member of the Masonic organizations, Elks and other fraternal orders and of numerous clubs in Manitowoc, Chicago and New York. He maintained a winter home in Leesburg, Fla. He is survived by a widow and a daughter, the latter married and living in Spain.

New England Crushed Stone Association Organized

THE New England Crushed Stone Association has been organized, one of the principal objects being unity of action and purpose in resisting attempts to limit blasting operations by public authorities. The industry is threatened with serious handicaps from ill-advised local blasting regulations.

Bernard McKinney, of the West Roxbury Trap Rock Co., West Roxbury, Mass., is president, and H. R. Brownson, Rowe Contracting Co., Malden, Mass., is secretary.

American Paving Contractors Get Big Job in Peru

A CONTRACT just awarded Warren Bros. Co., Boston, Mass., by the Republic of Peru is with the federal government and covers the construction of 1000 kilometers, approximately 600 miles, of roadway extending from the capital city of Lima south along the coastal range to Arequipa, from Haunuco to Puerto Leguia and from Auacucho to Cuzco.

The roadway will be constructed of rock macadam of special type adapted to the peculiar needs of the country in accordance with the latest engineering practices. Payment of the total contract price of $12,000,-000 is to be made by Peru in cash.

This contract is the first obtained by Warren Bros. in that country. Possibilities for additional road building contracts both with the government of Peru and its political subdivisions are considered promising. At present Warren Bros. is operating or has contracts for road building in 12 different countries outside of the United States.

Quarry Blasting Accident Kills Six

SIX persons, two workmen, a youth and three children, were killed by an explosion of dynamite at a rock quarry near Union, W. Va., on May 18, according to Associated Press dispatches.

Six cases of dynamite in a blacksmith shop used for road construction work on the Seneca trail exploded. The two workmen, Paul Shires of Union and Oscar Johnson, Jacks Mills, were in the shop. Their bodies were blown into fragments.

The bodies of three children of Mrs. Bella Wiseman, a widow living near the quarry, were found near the building. A son of Frank Weile of Salt Sulphur Springs, who was employed as a water boy in the road construction, was the other victim. He lived for a few minutes after the blast.

Hydraulic Stripping Involves Quarry Company in Lawsuit

DAMAGE in the sum of $1,000 is sought in a suit filed today by Lew E. Dillman, of Clear Creek, Ind., against the Indiana Limestone Co. The action is the outgrowth of the company using a stream which also passes through the Dillman land. It is alleged that hydraulic methods are employed by the stone company in removing debris and yellow clay, and that this makes the water muddy and unwholesome for the stock of the plaintiff to drink. It is also alleged that pollution of the stream has reduced the rental value of the farm.—*Bloomington* (Ind.) *World.*

Cement Mill Trophy Delegates Make New York Trip

FIFTY-TWO DELEGATES, representing the member mills of the Portland Cement Association which operated during 1929 without lost-time, permanent disability or fatal accidents, are making the annual pilgrimage of safety delegates to New York, now a well-established feature of cement plant safety work.

Leaving their homes in various parts of the country, the delegates are due to arrive in New York on Sunday evening, May 25, where they will be established in a group of adjoining rooms in Hotel Roosevelt. The reception committee for the delegates will consist of E. H. Parry, safety director of the Glens Falls Portland Cement Co., chairman; Col. H. A. Reninger, manager of safety department, Lehigh Portland Cement Co.; Fred B. Hunt, safety engineer, Nazareth Cement Co.; David Adam, safety engineer, Lawrence Portland Cement Co.; W. M. Powell, safety director, Medusa Portland Cement Co.; W. W. Hamilton, safety director, Alpha Portland Cement Co., and Gordon Huth, safety director, Universal Atlas Cement Co.

On Monday evening, May 26, the delegates and committee are to be guests of J. B. John, chairman of the Committee on Accident Prevention of the Portland Cement Association, at the Hotel Commodore in New York. On May 27 and 28, they are luncheon guests of the association, and on the evening of May 27 they will attend the formal dinner of the association at the Biltmore Hotel.

Formal award of the association safety trophies for 1929 will occur at 2 p. m. on Wednesday, May 28, in the Biltmore music room, in the presence of one of the most distinguished audiences ever assembled in the industry. President Frank H. Smith of the association and J. B. John are in charge of the ceremonies.

List of Delegates of Winning Mills

Cowell Portland Cement Co., Cowell, Calif. (1330 days)*

Delegates: **Henry A. Stenger,** master mechanic; employed at Cowell mill 19 years; member of plant safety committee for several years. No accidents in his department since July 6, 1925. **Frank A. Isberg,** commissary department; employed at plant 1½ years. Commissary department never had an accident.

Lehigh Portland Cement Co., Iola, Kan. (1209 days)

Delegates: **James A. Fisher,** quarry foreman; employed by the company in 1910; quarry foreman at Iola since 1916; member of plant safety committee continually since its organization. **Lloyd Carter,** mechanical engineer since 1918; member of plant safety committee since its organization.

Alpha Portland Cement Co., Ironton, Ohio (1119 days)

Delegates: **W. L. Patterson,** foreman of limestone mine, who is completing 25 years of service with the cement industry; at the Ironton plant 21 years; chairman of the plant safety committee and has had no lost-time accidents in his mine since September 21, 1926. **J. B. Hall,** chief clerk and paymaster, has been employed at Ironton plant 14 years, which represents his entire period of experience in the industry; is a member of the plant safety committee.

Consolidated Cement Corp., Mildred, Kan. (1020 days)

Delegates: **E. L. Drury,** assistant superintendent, is mayor of the city of Mildred; has been employed in the cement industry for ten years, the last nine years of which were at Mildred; has been an enthusiastic safety worker during this entire period. **P. L. Patterson,** general mill foreman, has been in the cement industry 16 years and at Mildred mill for seven years; has been a member of the plant safety committee for several years and has had no accidents in his immediate department for over three years.

Alpha Portland Cement Co., Bellevue, Mich. (990 days)

Delegates: **Albert Toutant,** quarry foreman, has been employed in the industry 23 years, 19 years of which have been at the Bellevue quarry; is a member of the plant first-aid committee which "put over" 100% training in the plant organization, and has had no accidents involving loss of time in his immediate department since December 4, 1925. **Gifford Leeser,** storekeeper, is secretary of the plant safety committee; has had no accidents in his department since August 7, 1922. He has gained his entire cement plant experience at Bellevue plant, where he has been employed 13 years.

Lehigh Portland Cement Co., Ormrod, Penn., Plant No. 3 (847 days)

Delegates: **Samuel P. Helfrich,** assistant to general foreman, was employed first by the American Cement Co. and later by the Atlas Portland Cement Co., joining the Lehigh organization in 1903. He was made foreman over 22 years ago and was one of the organizers in 1914 of the original Lehigh safety committee at Ormrod, of which he is still an active member. **Francis E. Laubach,** carpenter foreman of Ormrod plants, was employed by Lehigh in December, 1902, as a carpenter, assisting in the construction of Ormrod mill No. 3; assisted in the construction of Mitchell (Ind.) mill No. 2 in 1905, Fogelsville (Penn.) mill H in 1906, New Castle (Penn.) mill No. 2 in 1907, Belleville (Ont.) mill in 1908, and Mason City (Iowa) mill in 1911. For the past 17 years Mr. Laubach has been carpenter foreman at Ormrod and he is now in his 28th year with the Lehigh company.

Trinity Portland Cement Co., Dallas, Texas (766 days)

Delegates: **Henry F. Lamb,** general mill foreman, has been employed in the cement industry in various operating capacities for 38 years, the last 13 have been with the Trinity mill at Dallas; has been a member of the plant safety committee for many years and is known as an "old-timer" in the safety movement. **C. A. Sutherland,** machine shop foreman, has been a cement plant machinist for 25 years; went to work for the Trinity company at Dallas 21 years ago and has made himself a power in the safety work of the plant. Unfortunately, his department suffered an accident on February 24, 1930, after over three years without a day's loss of time.

Universal Atlas Cement Co., Duluth, Minn. (724 days)

Delegates: **F. O. Robinson,** general operating foreman, cast his lot with the cement industry 30 years ago, going with Universal April 12, 1900. When Duluth mill was built, in 1915, he was transferred to it from Buffington, receiving his new assignment August 2 of that year; is a member of the general safety committee of the mill and was field chairman in 1928. No department under his watchful eye has suffered an accident since January, 1926. **O. B. Potter,** master mechanic, entered the cement business 26 years ago and joined the Universal operating organization May 1, 1911; went to Duluth when construction was under way in 1914; during 1929 served as field chairman of the Duluth safety organization. The last accident in the force under his supervision occurred in January, 1928.

Lone Star Cement Co., Alabama, Birmingham plant (657 days)

Delegates: **E. T. Rascoe,** carpenter and repairman, has had no accidents in his department during the past 4½ years or longer, since the plant was taken over by the present company; has been employed in the industry for seven years, during the entire period at this mill. **L. K. Briley,** electrician; employed at Birmingham plant six years ago; alternate member of mill safety committee; last accident in his department occurred three years and eight months ago.

Hercules Cement Corp., Nazareth, Penn. (644 days)

Delegates: **Ernest M. Ayres,** chief operating engineer, entered the cement industry 18 years ago; has been at the present mill 3½ years; in addition to his duties as chief engineer he is in charge of first-aid activities and is a well-known safety booster; no accident has occurred within the force under his direction for a period of several years. **Marvin H. Parsons,** labor foreman, is a member of the mill safety committee and has been employed by the Hercules corporation for 6½ years; there have been no lost-time accidents in the force under his supervision since January, 1926.

Medusa Portland Cement Co., Toledo, Ohio (636 days)

Delegates: **J. K. Schoenegge,** general mill foreman, is completing 18 years of service in the cement industry, nine with the Medusa company and six at the Toledo mill; is an enthusiastic safety advocate and member of the mill safety committee. The last accident to his force occurred in March, 1925. **B. F. Hobbins,** assistant superintendent; 14 years ago took his first position in a cement mill, and seven years ago, when the Toledo mill was built, he went with Medusa; is a member of the mill safety committee and has been a conscientious safety booster for many years.

Lone Star Cement Co., Alabama, Spocari plant (622 days)

Delegates: **Warren T. Lambert,** repairman, has been a member of the repair department force at Spocari for 11 years and served on the mill safety committee during its successful cam paign against accidents last year. **Raymond A. Grable,** a carpenter foreman, is a member of the present safety committee at Spocari, where he has worked at his present occupation for six years.

*Indicates days from last lost-time accident to January 1, 1930.


1330 DAYS
H.A. STENGER
F.A. ISBERG
1209 DAYS
J.A. FISHER
LLOYD CARTER
W.L. PATTERSON
947 DAYS
S.P. HELFRICH
F.E. LAUBACH
766 DAYS
H.F. LAMB
C.A. SUTHERLAND
836 DAYS
J.K. SCHOENFOOT
B.F. HOGGINS
822 DAYS
W.T. LAMBERT
R.A. GRABLE
F.M. ARNOLD
493 DAYS
W.H. JONES
C.F. WALTERS
489 DAYS
W.R. FOSTER
J.T. LOVERY
420 DAYS
R.G. SUTHERLAND
A.E. FLOWERS, JR.
413 DAYS
F.M. BRINKER
C.M. RHEN
C.W. ROWE
DELEGA
of
1929 SAFETY TROPHY
PORTLAND CEMENT


F.M. ARNOLD
HARRY SERGEANT
ANSON SITTLER
FRANK S. LEH
C.W. ROWE
H.A. LEONARD
PHILIP FORSYTH
HARRY STEPHENS
ELEGATES
of
Y TROPHY WINNING MILLS
AND CEMENT ASSOCIATION

4, 1930


980 DAYS
ALBERT TOUTANT
GILFORD LEESER
644 DAYS
E.M. AYRES
H.H. PARSONS
518 DAYS
M.T. BREWER
F.W. SANDOZ
R.M. WALKER
377 DAYS
J.T. HUSTON
P.R. JORDAN

Southwestern Portland Cement Co., Victorville, Calif. (543 days)

Delegates: **Frank M. Arnold,** superintendent of quarry and railroad, became associated with cement manufacturing 15 years ago and 13 years ago went with the Southwestern company at Victorville; has long been known as a safety booster and member of the general safety committee at Victorville plant. His quarry operated two years and his railroad force one year and nine months without a lost-time accident. **Harry Sergeant,** safety and welfare supervisor, has had 11 years' experience in cement-mill supervisory and personnel work and has been at Victorville during the last three years, a period of notable improvement in record.

Lehigh Portland Cement Co., Ormrod, Penn., Plant No. 2 (522 days)

Delegates: Lloyd E. Diehl, general foreman, was employed by Lehigh in April, 1899, and has seen continuous service at Ormrod since that date, as cooper's helper, oiler, second engineer, first engineer, repairman and night foreman; since 1917 general foreman; a member of the plant safety committee continually since it was organized 15 years ago. **Anson Sittler,** quarry foreman, went to work for the Lehigh company in May, 1916, as steam-shovel fireman; later steam-shovel operator, foreman in charge of shovels and driller foreman, receiving charge of the quarry eight years ago. His department has worked without lost-time accidents since November 19, 1926.

International Portland Cement Co., Spokane, Wash. (518 days)

Delegates: **H. T. Brewer,** superintendent; **F. W. Sandoz,** quarry superintendent.

Lehigh Portland Cement Co., Birmingham, Ala. (493 days)

Delegates: **W. H. Jones,** coal miller and extra coal mill foreman, was employed by the Lehigh company in 1923 and for the past four years has been a member of the plant safety committee. **Charles F. Walters,** bag-house foreman, came to the Lehigh organization in 1924 as storeroom clerk; has been an ardent safety worker and member of the plant safety committee for several years.

Lone Star Cement Co., Louisiana, New Orleans, La. (489 days)

Delegates: **W. R. Foster,** labor foreman and member of the plant safety committee, has been employed at the New Orleans mill three years, and for the last two years his force has worked without loss of time due to accident. **J. F. Lowry,** shipping clerk, pack house, has been employed in the industry four years and at New Orleans plant three years.

Lone Star Cement Co., Virginia, Norfolk, Va. (466 days)

Delegates: **O. H. Enax,** chief electrician, has been very active in safety and first-aid work and has been chairman and member of the mill safety committee for a long period; with the cement industry 16 years, has been with the Lone Star organization nine years and at Norfolk mill four years. His department has had no accidents in over two years. **Robert Stevens,** raw mill operator and member of mill safety organization, has operated his department for over 20 months without accident and expects to continue indefinitely; has been employed at Norfolk mill 3½ years.

Lone Star Cement Co., Pennsylvania, Nazareth, Penn. (463 days)

Delegates: **Frank E. Leh,** master mechanic, is a member of one of the best known families of cement makers in the country and has been connected with the industry 29 years; has been at the Lone Star mill at Nazareth for four years and has operated his department without accident for over two years; was chairman of the mill safety committee during the latter half of 1929. **Edward M. Norris,** quarry foreman, was chairman of the mill safety committee during the first six months of 1929; has been engaged in the cement industry for ten years, nine of which were at his present quarry; no accidents serious enough to cause loss of time have occurred in his department for nearly three years.

Wabash Portland Cement Co., Osborn, Ohio (461 days)

Delegates: **Donald Swartout,** mill foreman and member of mill safety committee, has completed 15 years' service in the cement industry and four for the Wabash company at the Osborn mill; no recordable accidents in his department since September 22, 1928. **R. M. Walker,** chief electrician and member of mill safety committee, took his first cement mill job 13 years ago and joined the force at Osborn two years ago; his department has had no lost-time accident since March 14, 1927.

Trinity Portland Cement Co., Houston, Texas (420 days)

Delegates: **R. G. Sutherland,** superintendent, has been engaged in the cement industry for nine years and for two years has been in charge for the Trinity company at Houston; safety of his workmen is a hobby with him as it is with all of the officials of his company. **A. E. Flowers, Jr.,** plant chemist, also acts as safety director; has been employed in the cement industry five years and at Houston plant three years.

Vulcanite Portland Cement Co., Phillipsburg, N. J. (413 days)

Delegates: **Floyd M. Brinker,** painter and glazer attached to the building maintenance department, has been with Vulcanite for 29 years; is an ardent member of the mill safety committee and there never has been a lost-time accident in his department. **Cleveland M. Rhen,** foreman, sheet-iron shop, has been employed at Vulcanite for seven years and his department has been free from accident since August, 1927. He is a member of the mill safety committee.

Medusa Portland Cement Co., York, Penn. (gray cement plant) (403 days)

Delegates: **C. W. Rowe,** general mill foreman, has been employed in the industry 20 years, with Medusa three years and at York mill two years and nine months; the force under his supervision has had no accidents sufficient to cause loss of time for 18 months. He is a member of the mill safety committee. **H. A. Leonard,** general night mill foreman, has had 18 years' experience in cement mill operation and has been with Meudsa at York mill for 2½ years.

Pacific Portland Cement Co., Redwood City, Calif. (400 days)

Delegates: **Philip Forsyth,** mill foreman and member of general safety committee; no lost-time accidents have occurred in force under Mr. Forsyth's direction since mill was started 5½ years ago; took up his work in the cement industry 19 years ago, was employed by the Pacific company 13 years ago and has been at Redwood City mill since it was started in 1924. **Harry Stephens,** master mechanic, member of general safety committee and captain of first-aid team, has been connected with the cement industry since 1915 and with the Pacific company at Redwood City mill since 1924.

Alpha Portland Cement Co., Cementon, N. Y. (389 days)

Delegates: **Earle C. Sandt,** plant chemist, in the employ of the Alpha company 22 years. **Daniel Ziegler,** plant engineer for nine years.

Great Lakes Portland Cement Corp., Buffalo, N. Y. (377 days)

Delegates: **J. T. Huston,** mill foreman, is a member of the mill safety committee and leader of the kiln building group; the organization under him has gone 782 days without loss of a day's time; has been employed in the industry 25 years and has been with Great Lakes at Buffalo for two years. **Patrick R. Jordan,** machine shop foreman, member of the mill safety committee and leader of the shops group, has been with Great Lakes 3½ years. His department has completed about 1200 days without mishap.

West Penn Safety News

NO. 9, Vol. 1 of the *West Penn Safety News,* a new monthly magazine for employes of the West Penn Cement Co., Butler, Penn., has come to hand—the first copy, we understand, to be issued in regular magazine form. We quote from the introductory editorial:

"The *West Penn Cement Safety News* is to be put out entirely by the employes of the company and every man working for the company, we hope, will feel that he has a part in its publication. The primary object of the magazine, is to promote greater safety among the employes. We feel, however, that the safest employe is the man who is happy in his work, who understands his work and the attitude of his employers toward himself. To put the matter in a nutshell we believe that a magazine such as the *News* will promote better feeling and harmony among the men, perhaps create a little fun and pleasure that we would otherwise not have, and that the reaction from all this will be to cause reduction in our accidents.

"We all know that the effect of an accident is not always to cause the most suffering to the injured man. More often the principal sufferer is the loyal wife at home and the children. If more of us looked at safety from this angle there would doubtless be a great reduction in industrial accidents.

"The *News* will therefore be published for the families at home as well as the men at the mill and in our offices and mines. If we can bring the idea of safety into our homes and our schools we will aid in a nation wide safety program which some day will free us from the burden of accidents.

"The editors feel that the magazine will be a success only if we have the co-operation of all the employes. We want the *News* to be something we can be proud of. We feel that our community does not end with the territory immediately surrounding the mill but that it reaches out to the nearby towns and villages. Let's all get together and put the *News* across."

The new monthly contains 16 pages, is well gotten up typographically and editorially; it would be a credit to a regular publisher. F. E. Lang, H. E. Wilkinson, J. A. Younkins, H. R. Langston and Garrett Tyrrell are the editors; L. Campbell, artist, J. R. Terry, business manager, A. E. Hiscox, advisory.

Medusa Cement to Build New Silos at Manitowoc

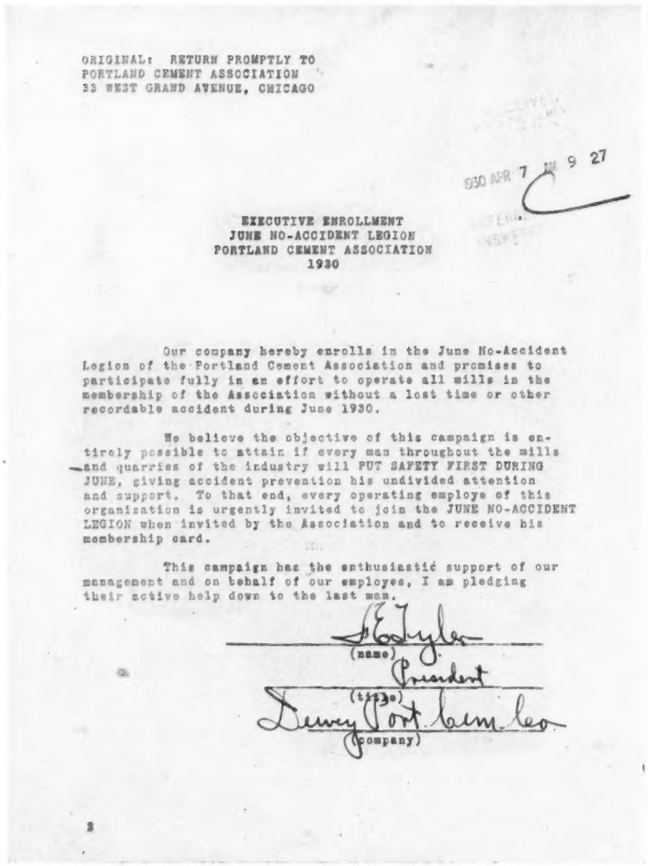
WORK on the erection of a $30,000 silo on Spring street, Manitowoc, Wis., has been started by the Medusa Portland Cement Co., according to a permit issued recently to the company by Building Inspector J. H. Peppard.

The contract is the largest let so far this year in Manitowoc for an industrial enterprise.—*Manitowoc* (Wis.) *Herald-News.*

Cement Mills Enroll in Fifth June No-Accident Campaign

Object Is to Smash All Previous Safety Records

ONE HUNDRED SIXTY-FOUR cement plants represented in the membership of the Portland Cement Association have jointed an organization known as the June No-Accident Legion, for the purpose of smashing all records by operating their mills and quarries without accident during the month. The legion now has an active membership of 88 presidents and executives of cement companies, 30 operating executives, works managers and general superintendents, 22 safety engineers and 164 plant superintendents. On June 1, when the enrollment is complete, it is expected it will include also about 2450 mill and quarry foremen and department heads and about 37,000 workmen. It is believed that every workman throughout the entire industry will be enrolled.



ORIGINAL: RETURN PROMPTLY TO
PORTLAND CEMENT ASSOCIATION
33 WEST GRAND AVENUE, CHICAGO

1930 APR 7 PM 9 27

EXECUTIVE ENROLLMENT
JUNE NO-ACCIDENT LEGION
PORTLAND CEMENT ASSOCIATION
1930

Our company hereby enrolls in the June No-Accident Legion of the Portland Cement Association and promises to participate fully in an effort to operate all mills in the membership of the Association without a lost time or other recordable accident during June 1930.

We believe the objective of this campaign is entirely possible to attain if every man throughout the mills and quarries of the industry will PUT SAFETY FIRST DURING JUNE, giving accident prevention his undivided attention and support. To that end, every operating employe of this organization is urgently invited to join the JUNE NO-ACCIDENT LEGION when invited by the Association and to receive his membership card.

This campaign has the enthusiastic support of our management and on behalf of our employes, I am pledging their active help down to the last man.

F E Tyler
(name)
President
(title)
Dewey Portland Cem. Co
(company)

President Tyler of the Dewey Portland Cement Co., Kansas City, Mo., sends in the first enrollment for the June No-Accident Legion

Preparations for Campaign

The sequence of activities in preparation for the annual June campaigns in the cement plants is of unusual interest. The first step is taken by the Portland Cement Association, through its Accident Prevention Committee, in inviting the principal executive of each member cement company to pledge his support and co-operation. This step, which is considered one of the most important of the campaign, invariably leads to 100% enrollment in the operating department of each company, a condition absolutely essential to success.

To **F. E. Tyler,** president of the Dewey Portland Cement Co., Kansas City, Mo., goes the credit for signing his enrollment and getting it back into the hands of the Association before any other. Mr. Tyler's enrollment is reproduced herewith. There is always a race between executives for the position won by Mr. Tyler, which is settled by reference to the automatic time stamp affixed in the Association office.

All of the executives have copies of their enrollment posted throughout their mills and many make the matter the subject of a special communication to their workmen. The following extracts from letters on the subject written by leading executives to the Portland Cement Association will be of interest. **D. S. MacBride,** vice-president, Lone Star Cement Co., Pennsylvania:

"It is a privilege to again reaffirm our belief in the value of these annual safety drives. Several years ago I was frankly skeptical regarding the permanent good accomplished by the June campaign. I felt that attention was focused on this 30-day period in an effort to set a record, following which there was a let-down and a sharp increase in accident frequency. The consistent betterment year by year of the industry's accident records argues against this point of view.

"It seems more probable that we are profiting by the experience of no-accident months as well as by the lessons learned from efforts to bring plants through a year without a lost-time accident. Very probably we are learning by experience how to work more safely, a very important contribution towards this knowledge being the experience derived from these annual June campaigns.

"Therefore, it is a great pleasure to hand you our pledge of support and to enlist the Nazareth plant in this year's efforts to wipe out accidents in the cement industry."

Col. Henry A. Reninger, in charge of safety for the Lehigh Portland Cement Co.:

"We are enclosing herewith Executive Enrollment June No-Accident Legion, Portland Cement Association, for 1930, signed by E. M. Young, president, Lehigh Portland Cement Co.

"We expect to carry on our tenth June Safety Campaign in the Lehigh organization this year."

O. J. Binford, general manager, West Penn Cement Co.:

"We are in this movement 100%, and it gives me pleasure to sign the enrollment forms, one of which I am returning to you. The others will be posted at the plant."

George R. Gay, ranking official of the Santa Cruz Portland Cement Co.:

"I assure you that our company is heartily in accord with the movement for a 'No-Accident Campaign' during the month of June, 1930."

A. H. Ingley, treasurer, Standard Portland Cement Co.:

"The Standard Portland Cement Co. naturally wants to again be enrolled for the cement June No-Accident Campaign. We hope that June, 1930, will surpass all previous accomplishments."

B. F. Affleck, president, Universal Atlas Cement Co.:

"I have signed and am returning herewith the enrollment of our company in the June No-Accident campaign, copies of which will be posted in conspicuous places

at all our plants. I assure you that our organization will participate whole-heartedly in this campaign."

J. W. Johnston, vice-president, Lone Star Cement Co., Alabama:

"I have asked our plant superintendents to post a copy of this enrollment on our bulletin boards and to make it the subject of special mention at our next safety meeting. You may count on the co-operation of our company 100%."

H. E. Hilts, vice-president, Cuban Portland Cement Co.:

"My enrollment has been translated into Spanish and is being sent to our plant for posting. You may be sure of our earnest co-operation, as we have rendered in the past, towards the success of this campaign."

A. C. Tagge, president, Canada Cement Co., Ltd., insisted on having the general manager and general superintendent of his company sign jointly with him:

"Our company hereby enrolls in the June No-Accident Legion of the Portland Cement Association and promises to participate fully in an effort to operate all mills in the membership of the Association without a lost-time or other recordable accident during June, 1930.

"We believe the objective of this campaign is entirely possible to attain if every man throughout the mills and quarries of the industry will PUT SAFETY FIRST DURING JUNE, giving accident prevention his undivided attention and support. To that end, every operating employe of this organization is urgently invited to join the JUNE NO-ACCIDENT LEGION when invited by the Association and to receive his membership card.

"This campaign has our enthusiastic support and on behalf of our employes we are pledging their active help down to the last man."

After the enrollment of the company heads are secured, the senior operating officers enroll and they are followed in turn by their assistants and associates and by the plant superintendents. Each superintendent enrolls his foremen and department heads a few days prior to June 1, and on May 31 enrolls all of the workmen by inviting them to sign a pledge card especially prepared for this campaign, with duplicate portion to be retained by the signer as a reminder.

Foremen Organizing to Win

Every plant and quarry foreman and department head in the industry has been enrolled and every department is being organized. The following statement is being subscribed to by every foreman:

"My department hereby enrolls for the June No-Accident Campaign and will make every possible effort to operate without accident during the course of the campaign and as long thereafter as possible.

"You may count on me to read all instructions carefully and to make all of my men familiar with the objects and activities planned in connection with the campaign.

"I promise faithfully to ascertain and give assurance to my superintendent that all employes of my department are in good health, in full possession of mental and physical faculties and capable of completing their usual duties during June without an accident. In cases where employes of my department are not considered safe men with which to enter this campaign, I promise to take up each case with our superintendent and exert my best efforts to eliminate the hazards involved.

"I also promise to conduct a general inspection and 'clean-up' of my department during the week of May 26-31, thoroughly covering all of the following items:

"General premises and buildings used by my department. Walks, pasageways, stairs, handrails, doors, windows and openings.

"Machinery of all kinds and power apparatus.

"Conveyors, cables, chains and transmission.

"Railroad, craneways, elevators, automobiles and trucks.

"Tools and portable equipment.

"Material—raw and finished, in process or in storage.

"Waste material and objects in storage or not in use.

"Supplies and supply storage, including explosives magazines.

"Wash rooms, lockers, and employes' personal property.

"Protective apparatus, including fire and blasting alarms.

"Goggles, safety shoes, insulators, switch locks, emergency stops.

"First aid apparatus and facilities.

"The above inspection will be faithfully repeated daily during the month of June either by myself or by an assistant for whose intelligence and thoroughness I am willing to vouch.

"It is my belief that my department, by exerting all possible watchfulness and avoiding all unnecessary hazards, will be able to operate throughout June without a lost time accident."

"(Signed) .....

"Title) ....."

The handsome green flag of the campaign with its single gold star will feature the no-accident campaign starting June 1

Mass Meetings in All Plants

Mass meetings at which all of the workmen will sign their pledge cards and receive final advice and instruction for the campaign will be held in most of the plants on Saturday, May 31. A certain number of the mills will hold these meetings before or after this date as a matter of convenience, but throughout the industry the spirit is the same and eagerness to win is everywhere evident.

At sunrise June 1, the handsome green flag of the campaign, bearing a single, large gold star, will flutter to the masthead of each plant flagpole from Edmonton, Alberta, to Buenos Aires, Argentina, and the great annual no-accident classic will be on. From the preliminary interest shown there is every indication that the June campaign will fulfill in every way the anticipations of its sponsors.

Dates Set for Cement Association Safety Trophy Dedications

AN ADDITIONAL NUMBER of cement plants on the list of winners of the Portland Cement Association safety trophy for 1929 have set dates for the formal dedication and unveiling of the trophy monuments. They are as follows:

Thursday, June 5. Alpha Portland Cement Co., Bellevue, Mich., will hold a celebration in honor of the reinscribing of its trophy for a safe record of *two calendar years.* Leading Alpha officials and local citizens will attend.

Tuesday, June 10. Medusa Portland Cement Co., Toledo, Ohio, will dedicate and unveil its new trophy with President J. B. John, General Superintendent W. L. White, Jr., Safety Director W. M. Powell and Superintendent W. J. Worthy in charge. Several hundred visitors are expected at the plant for one of the biggest industrial celebrations ever held in the vicinity of Toledo.

Friday, June 13. Medusa Portland Cement Co., York, Penn. (gray cement plant), will celebrate in honor of a new trophy. In general arrangements it will be similar to that held at Toledo, on June 10. R. J. Landis is superintendent of the York plant.

Tuesday, July 8. Alpha Portland Cement Co., Ironton, Ohio, will celebrate the completion of *three calendar years* without accident and over three years and nine months' actual time since the last lost-time injury occurred to a workman. President G. S. Brown, Safety Director Hamilton and other Alpha officials will assist Superintendent F. C. Brownstead in entertaining the mill force and their families and prominent local citizens and friends.

Thursday, July 10. Lone Star Cement Co., Virginia, Norfolk, Va., will unveil a new trophy. The mayor and a large company of local officials and citizens have been invited by Vice-President Dwight Morgan and have accepted. Superintendent George F. Martinez will be in charge of the ceremonies, which start at 4:30 p. m., and include dinner and other features.

Saturday, September 6. International Portland Cement Co., Ltd., Spokane, Wash., will unveil and dedicate a new trophy at Irvin, a suburb of Spokane. President R. K. Niell, Secretary H. M. Heleniak and Superintendent H. T. Brewer will direct the celebration, at which it is expected to have present a large group from the industries of Spokane.

Tuesday, September 17. Pacific Portland Cement Co., Redwood City, Calif.: President R. B. Henderson, Vice-President J. H. Colton and Superintendent M. J. Johnsson are making the arrangements. As this celebration will occur on the day following the regional safety meeting of the Portland Cement Association in San Francisco a large number of visiting cement plant delegates are expected.

The list previously announced includes: Lehigh Portland Cement Co., Birmingham, Ala., June 3; Lehigh Portland Cement Co., Iola, Kan., June 5; Consolidated Cement Corp., Mildred, Kan., June 8; Great Lakes Portland Cement Corp., Buffalo, N. Y., June 11; Lehigh Portland Cement Co., Ormrod, Penn., June 18-19; Lone Star Cement Co., Alabama, Birmingham, Ala., June 17; Spocari, Ala., June 18; Lone Star Cement Co., Louisiana, St. Stephens, Ala., June 19; New Orleans, La., June 21, instead of the 20th, as previously announced; Cowell Portland Cement Co., Cowell, Calif., July 4; Trinity Portland Cement Co., Houston, Tex., July 4.

Cement Industry Awarded Safety Medals

RECOGNITION of its work in promoting safety in cement plants has been given to the Portland Cement Association by the award of a certificate of honor by the Joseph A. Holmes Safety Association, which is closely allied with the U. S. Bureau of Mines. In awarding the certificate, it was pointed out that in 1924, the year in which the association started its safety campaign, only one plant out of a total of 105 operated throughout the year without a single lost-time accident, whereas in 1929, 28 out of 153 plants achieved this distinction.

A similar certificate was also awarded to the Lehigh Portland Cement Co. for its excellent safety work and safety record. At least one plant of this company has completed the calendar year without a lost-time accident in every year except one since 1924. In 1928 five plants had no lost-time accidents, and in 1929, four. The company's plant at Iola, Kan., has not had a lost-time accident to any of its more than 200 employes since September 10, 1926, nearly three and one-half years, and its plant 3, at Ormrod, Penn., has now gone more than two years without a lost-time accident.

A Kansas Railway in the Gravel Business

DIVERSIFIED FARMING has proven successful, and so has diversified railroading in Pratt, Kan. The Wichita-Northwestern road, with headquarters in Pratt, has put the new method into practice here.

The road owns land just north of its depot. Beneath the grass there lies a wealth of sand and gravel. The road dug a pit and is now taking from 900 to 1,000 tons of gravel and sand from the pit daily. It is supplying the Rock Island with sand for commercial purposes. Several near-by counties are using the gravel for road material.—*Topeka* (Kan.) *Capital.*

Output of Masonry, Natural, and Puzzolan Cements in 1929

STATISTICS of hydraulic cements, other than portland cement in 1929, which include masonry, natural and puzzolan cements, as compiled by the United States Bureau of Mines, Department of Commerce, show a production of 2,209,465 bbl., which represents a decrease of 0.04% compared with 1928. There were shipped from mills in 1929, 2,159,130 bbl. of these cements, valued at $2,950,717, a decrease of nearly 2.5% in quantity, and an increase of 1.4% in gross value compared with 1928. Stocks at the mills increased and were more than 36.6% higher at the end of 1929 than at the end of 1928.

These statistics represent the output of 11 plants located as follows: One each in Alabama, Illinois, Indiana, Kansas, Kentucky, Ohio and Pennsylvania; and two each in Minnesota and New York. The figures for 1929 include the output of a new plant in New York which began operating toward the end of 1929 superseding an establishment that was active in 1928, but reported idle and out of business in 1929.

The output has been expressed in terms of 376-lb. barrels to correspond with the statistics of portland cement.

MASONRY, NATURAL, AND PUZZOLAN CEMENTS PRODUCED, SHIPPED, AND IN STOCK IN UNITED STATES, 1928 AND 1929

Year	Active plants	Product'n Barrels	—Shipments— Barrels	Value	Stock* Barrels
1928	11	2,210,404	2,213,645	$2,910,097	†137,357
1929	11	2,209,465	2,159,130	2,950,717	187,692

*At December 31. †Revised.

State of Virginia Invests in Portable Agstone Plant

A PORTABLE limestone grinding plant will be brought to Washington County, Va., and operated somewhere between Meadowview and Glade Spring for six months beginning early in June.

The plant will be brought to the county by the agricultural department of Virginia and lime rock crushed at one of the many quarries in the section and sold to farmers at actual cost of crushing.

For this plant the General Assembly of Virginia appropriated $25,000 at the last session of that body. This action was taken in order to encourage farmers in the use of lime, which is very necessary in raising of all farm crops, by furnishing it to them at the lowest possible cost.

The crushed limestone will be in very fine form and so quickly available for agricultural purposes. This plant, which is now being assembled in Richmond, will be a large crusher operated by a steam engine and moved by tractor. It will have a daily output of 50 tons. About 30 state convicts will be used in operation. After this operation it will be taken to another county in Southwest Virginia.—*Bristol* (Tenn.) *Courier*

Sea-Going Gravel Plant for Chicago

THE DISCOVERY of large gravel deposits in the southern end of Lake Michigan will cut the cost of this material for construction work, according to J. C. Hoskins of the Marine Dredge and Gravel Co. of Chicago. The company on May 20 exhibited in the river near Wabash avenue the steamboat *Brazil*, which, Mr. Hoskins said, was built to gather the gravel from the lake bed and wash and screen it for delivery.

"The gravel for construction work heretofore has been taken from land pits," said Mr. Hoskins. "The boat is equipped with pumps to suck the gravel from a 60-ft. depth and a separator to take out the sand. This method will make a reduction of 25% in the cost of gravel."

The low bids submitted for the construction of the first section of the outer link bridge were made possible by the new method of obtaining gravel at a reduced cost, according to Mr. Hoskins.—*Chicago* (Ill.) *Tribune*.

Universal Atlas Cement's New York Offices

THE UNIVERSAL ATLAS CEMENT Co., an amalgamation of the Universal Portland Cement Co. and the Atlas Portland Cement Co., a subsidiary of the United States Steel Corp., has leased more than half the 14th floor in the Chrysler building at Lexington avenue and 42nd street, New York City.

The former Universal offices at 30 Church street and the Atlas executive offices at 25 Broadway and sales offices at 41 East 42nd street are to be combined in the Chrysler building.

National Safety Calendar

THE 1931 edition of the Safety Calendar issued by the National Safety Council, Chicago, Ill., is now ready and should be of interest to all rock products producers.

The calendar has twelve paintings, one for each month of the year, calculated to impress upon the men working in the plant the need for safety precautions to avoid needless accidents.

The paintings are now printed in six colors as compared with four in the past and they are more realistic than ever before. The reverse side carries twelve pages of safety information based on seasonable hazards for quick and easy reference. The Council advises that last year 725,000 copies were ordered as against 650,000 the previous year and 180,000 in 1920.

Firm names will be imprinted on the calendars, if desired, on orders of 200 or more at no extra charge, and a 3 per cent discount is offered for early orders, with no need to pay for them until December 1.

Selling Sand and Gravel

A MOST interesting and attractive booklet printed in two colors is being circulated by the Estill Springs Sand and Gravel Co., Estill Springs, Tenn., to customers and prospective customers.

The cover carries a striking view of the plant, and the foreword is a letter of appreciation to present customers for the business given the company. Then follows a detailed description of the company's various grades of sand and gravel, together with reproductions of test reports by the Pittsburgh Testing Laboratory. A description of the plant and the process of preparing the sand and gravel is also given with interesting pictorial illustrations. The booklet concludes with an account of outstanding construction work in which the company's products have been used. There is no doubt that the unusual methods in advertising evidenced in this Estill booklet will be the means of attracting profitable new accounts.

Front cover of attractive booklet issued by the Estill Springs Sand and Gravel Co.

Polish Lime Industry

IN 1927 the Polish lime industry operated 76 of its 90 lime-burning plants, producing 568,600 tons of building lime and 95,200 tons of other lime, while the capacity was 1,160,000 tons.

Methods Employed in Mining Barite

THE MINING of barite in the United States is carried on by three distinct methods, according to the United States Bureau of Mines. Surface mining by hand predominates in the Missouri district; mechanical mining on the surface is employed in Georgia and Tennessee, and underground mining is conducted in California.

Practically half of the barite mined in the United States is produced by hand-mining methods. In Missouri, where this method is used very extensively, the miner's tools comprise a pick and shovel, a small hatchet, a hand windlass, a rope and bucket, and a rattle box, or cradle screen. The miner selects a location, upon which he sinks a pit or shallow shaft from 3 to 5 ft. in diameter. The pit may be circular, but if the shaft is cribbed the upper part is usually square. The pit is very seldom sunk too deep to permit the miner to throw out the dirt by hand. If he can not throw out the dirt he must have someone to work the windlass. On the surface the dirt is worked over by pick and shovel, the lumps of barite are sorted out, and the larger pieces are cleaned of the adhering clay with a hatchet. Should the ore body be of sufficient size and show a tendency to branch out, drifting is carried on until the ore runs out or the rock caves in. When this occurs, or bedrock is reached, another pit is started, often within 8 or 10 ft. of the first and in the direction of the best ore. Drifts from one pit often lead into those from an adjacent one. The pits may be anywhere from 4 to 30 ft. deep, but generally, 8 to 12 ft.

As a rule, all the material associated with the barite is thrown out of the pits, although some miners do not remove more than is absolutely necessary. The miner always tries to remove the barite in the area between the pits, and thus he finally succeeds in getting all there is on his lot, which is usually 60 ft. square. Occasionally the undercutting or drifting is carried as much as 8 to 10 ft. from the pit, especially when the pit is of windlass depth. In such cases drifting is easier than sinking another shaft.

Hand methods, in many cases, have proved highly inefficient; some deposits have been worked over two, three, and sometimes four times, illustrating the poor recovery of the total barite in the ground by this method. Steam shovels have been able to work over ground that has been hand-mined several times and still produce sufficient quantities of barite. In the Missouri region, however, hand-mining methods are the most profitable and best adapted to deposits where the barite occurs in large lumps, or where the irregular bedrock makes mechanical methods difficult.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Ready-Mixed Concrete Producers Discuss National Organization

Meeting at Chicago Sponsored by National Sand and Gravel Association

A MEETING of considerable importance to the ready-mixed concrete and allied aggregate industries was held May 16, 1930, at the La Salle hotel, Chicago, Ill. This meeting, which was the outcome of action taken at the 1930 annual convention of the National Sand and Gravel Association at Memphis, was directed toward the organization of the ready-mixed concrete producers of the country, possibly as a unit of the Sand and Gravel Association. At the sand and gravel convention last January considerable interest was shown in the matter of forming such an organization, and a committee, headed by Alex Foster, Jr., of the Warner Co., Philadelphia, Penn., was appointed to take the matter up with the various ready-mixed concrete producers and arrange for an organization meeting. As a result of the committee's work representatives of 13 producing companies comprising a yearly output of some two million cubic yards of concrete were present, with a total attendance of more than 40 interested men.

The meeting was called to order by Robert J. Potts of Waco, Tex. (president of the National Sand and Gravel Association), who explained that in sponsoring the meeting as the result of the committee's action he wished to express the friendly interest of the National Sand and Gravel Association in the proposed new organization, and the desire of that association to help in any way possible, but that there was no desire to in any way influence whatever action might be taken by those present.

Alex Foster, Jr., of the Warner Co., Philadelphia, was chosen temporary chairman, and C. M. Cornell, of the Boston Sand and Gravel Co., Boston, Mass., temporary secretary.

Chairman Foster called for an expression of opinion concerning the desirability of forming the proposed organization and to find whether it should be an entirely independent organization or a branch of one of the existing organizations.

This was responded to by all of the producers present and a number of others interested, and showed a strong sentiment in favor of an association, with about an equal division of opinion as to whether or not it should be an entirely independent organization. Following this, a motion was made and carried that the chairman appoint a committee to draw up a plan of procedure and present it to the meeting for its action; and accordingly Chairman Foster named a committee, consisting of Messrs. Avril, Cahill, Bunn, Eakin, Levison, Shiely, Thomson and Young, with Mr. Young as chairman. Following a noon recess, Mr. Young reported for his committee as follows:

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J. E. Burke

I. *NAME*—The name of the association to be National Ready-Mixed Concrete Association.

II. *PURPOSE*—The purpose to be to promote the welfare and best interests of those engaged in the manufacture and sale of ready-mixed concrete, the protection of the manufacturers from unfair competition and the dissemination of information.

III. *MEMBERSHIP*—The membership to be made up of active members and associate members, the active members to be producers of ready-mixed concrete and the associate members to comprise machinery manufacturers and trade papers.

IV. *OFFICERS*—That a temporary executive committee of five be appointed by the chairman to canvass the industry further, as a whole, arrange for a meeting at Pittsburgh in 30 days, or as soon thereafter as possible, and to bring in a complete report for this meeting on the plan and scope of the proposed organization, including its recommendation for a manager.

V. *RELATIONS WITH THE NATIONAL SAND AND GRAVEL ASSOCIATION*—That the thanks of the meeting be extended to the National Sand and Gravel Association for its helpfulness and interest, and that the offer of the use of its facilities and its headquarters be accepted for as long as may be agreeable to both, any expenses incurred to be borne by this organization.

VI. *CO-OPERATION WITH OTHER ORGANIZATIONS*—That this organization intends to co-operate in every way with all other organizations or associations interested in concrete.

VII. *COSTS*—That those present at the meeting pledge not to exceed $50 per organization to defray expenses.

Following a further short discussion, the committee's report was adopted as a whole

and a temporary executive committee was appointed, consisting of the following: Joseph E. Burke, Ready-Mixed Concrete Co., Pittsburgh, Penn., chairman; Alex Foster, Jr., Warner Co., Philadelphia, Penn.; C. M. Cornell, Boston Sand and Gravel Co., Boston, Mass.; Arthur C. Avril, Avril Tru-Batch Concrete, Inc., Cincinnati, Ohio; Arthur A. Levison, Blaw-Knox Co., Pittsburgh, Penn.

The meeting was then adjourned until the call of the committee, which will meet in Pittsburgh May 28.

Attendance (Producers of Ready-Mixed Concrete)

Avril Tru-Batch Concrete, Inc., Cincinnati, Ohio; Arthur C. Avril.
Big Rock Stone and Material Co., Little Rock, Ark.; John C. Eakin.
Boston Sand and Gravel Co., Boston, Mass.; C. M. Cornell.
General Materials Co., St. Louis, Mo.; H. F. Thomson.
Henry Nelch and Son Co., Springfield, Ill.; H. E. Nelch.
Ready-Mixed and Supply Co., Albany, N. Y.; N. D. Crowley.
Ready-Mixed Concrete Corp., Chicago, Ill.; E. A. Cahill, J. H. Krehbiel.
Ready-Mixed Concrete Corp., Minneapolis, Minn.; P. T. Welch.
Ready-Mixed Concrete Co., Pittsburgh, Penn.; H. S. Davison.
Ready-Mixed Corp., Toronto, Ont., Can.; R. B. Young.
Ready-Mixed Concrete Co., Knoxville, Tenn.; John L. Humbard.
J. L. Shiely Co., St. Paul, Minn.; J. L. Shiely.
Warner Co., Philadelphia, Penn.; Alex Foster, Jr.

(Producers of Sand and Gravel)

Cordes Sand and Gravel Co., Memphis, Tenn.; V. A. Cordes.
Dixie Sand and Gravel Co., Chattanooga, Tenn.; J. E. Youngberg.
Peck-Thomson Sand Co., Kansas City, Mo.; F. W. Peck.
Potts-Moore Gravel Co., Waco, Tex.; Robert J. Potts.
Texas Construction Material Co., Houston, Tex.; W. H. Gemmer.

(Others)

Blaw-Knox Co., Pittsburgh, Penn.; Arthur A. Levison.
Building Supply News, Chicago, Ill.; L. J. Zorn.
Chain Belt Co., Milwaukee, Wis.; Mr. Miller.
Clinton Motors Corp., Reading, Penn.; George M. Bunn.
Concrete, Chicago, Ill.; E. E. Haight, Norman Stineman.
Jaeger Machine Co., Columbus, Ohio; H. L. Bachman, C. H. Grant.
Mack International Motor Truck Corp., Chicago, Ill.; W. E. Cameron.
National Sand and Gravel Association, Washington, D. C.; V. P. Ahearn, Stanton Walker.
Pit and Quarry, Chicago, Ill.; A. J. Hoskins, S. A. Phillips.
Portland Cement Association, Chicago, Ill.; W. E. Hart.
Portland Concrete Machines Co.; C. B. Dutton.
Ransome Concrete Machinery Co., Dunellen, N. J.; H. C. Peters.
Rock Products, Chicago, Ill.; E. C. Harsh, N. C. Rockwood, R. C. Sullivan.
Transit Mixers, Inc., San Francisco, Calif.; E. H. Hill, Jr., R. H. McMurray.
Universal Atlas Cement Co., Chicago, Ill.; G. L. Lindsay, S. G. Martin, A. W. Woodman.

J. L. Shiely Co. Building Second Ready-Mixed Plant

THE second large ready-mixed concrete plant of the J. L. Shiely Co., St. Paul, Minn., will be in operation by September, according to Joseph Shiely, president of the company.

This new mixing plant will be one of the best and most modern concrete mixing establishments in the country. Studies have been made regarding possible ways to improve the mixing machines and the arrangements of the different ingredients that go into the machines.

W. E. King of Toltz, King and Day, architects and engineers, at a meeting of the St. Paul Builders Exchange, pointed out the improved methods of mixing, and told how every possible improvement had been studied from similar projects and added to this new plant.

Concrete mixed at the plant and sent out to the location in which it is to be set is the latest improvement in the building industry, Mr. Shiely said. In the recently constructed Cobb building, the entire second floor was poured in the same day, an achievement that could not have been thought of before the new trucking system was introduced.—*St. Paul* (Minn.) *News.*

Florida Stucco Moving Into New Plant

THE STUCCO PRODUCTS CO., of Florida, Inc., within the next few weeks will move into its new plant now nearing completion at 100 Stockton street, Jacksonville, Fla.

Col. Carl. M. Pihl, president, stated that the new plant and business will represent an investment of $265,000, which will be increased by the end of 1930 to $300,000 or more.

The new factory has a capacity in excess of 10,000,000 lb. output per year, with land enough to provide buildings for more than ten times the capacity of the new plant.

The Stucco Products Co. manufactures a variety of products, including "Chief" brand portland cement stucco, which is waterproof and in colors. Its other products are stuccotex, composition floor material, magnesite stucco, stucco bond paint and portland cement paint.

All of these products are being shipped throughout a wide territory, by railroad, truck and steamship. Large quantities are going to territory along the eastern seaboard of the United States, much of it as far as Boston.

Although comparatively new in the field the products are being extensively used in other cities of Florida, Colonel Pihl stated. Especially is this true of the Tampa area.—*Jacksonville* (Fla.) *Times-Union.*

Governor Kills Bill Designed to Stop Sand and Gravel Operations on Long Island North Shore

DESPITE THE PLEAS of almost every major civic organization in Northport and Huntington, activity supported by town and village officials and the Long Island Chamber of Commerce, Governor Roosevelt, of New York State, has vetoed the Thompson bill, prohibiting the removal of sand and gravel from the Sound shore between Oldfield Point and Eaton's Neck. No reasons for his disapproval of the measure, which was passed in both houses of the Legislature by large majorities, have yet been made public, though it is believed he questions its constitutionality.

The bill, aimed principally at the Metropolitan Sand and Gravel Co., which is planning to dredge gravel from the former Hall property at Asharoken Beach, was introduced by Senator Thompson after a similar measure, sponsored by Assemblyman Hamilton F. Potter, had died in committee.—*Huntington* (N. Y.) *Bulletin.*

Russian River Gravel Co. Making Improvements

THE RUSSIAN RIVER GRAVEL CO., Healdsburg, Calif., has announced a contract with the Basalt Rock and Gravel Co. of Napa, whereby the Healdsburg company will furnish gravel to the Napa concern. The latter company, it was said, has abandoned its plan to build a spur track along the east side of the Russian river here, and to develop bars opposite Fitch Mountain.

Meanwhile the Russian River Gravel Co. is installing improvements costing $75,000. The output of the plant near the bridge south of town will be increased from ten cars per day to 25 cars.

The company is installing new concrete bunkers, and is changing its gasoline-engine driven cableway excavator, which has been used to remove the gravel from the river bed, for a belt-conveyor system. The local firm of Mills and Dean has the contract for installing electric equipment at the plant. All equipment is being placed on a 440 volt current.—*Santa Rosa* (Calif.) *Register.*

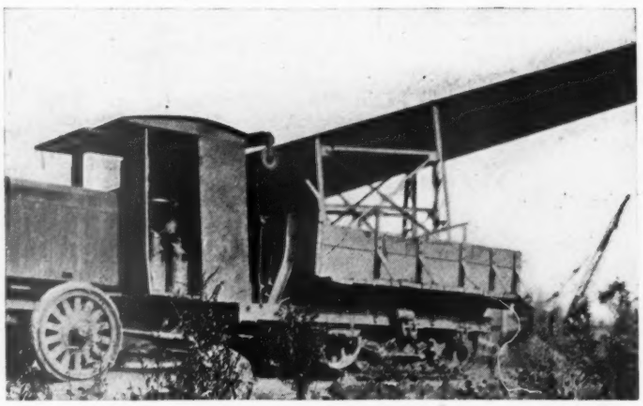
Illinois Quarry Changes Ownership

THE QUARRY and crushing plant at Joliet, Ill., formerly operated by the Markgraf Stone Co., is now operated by the Joliet Stone Co.

Quarry Stripping Experience and Costs with Tractor Trucks*

THE QUARRY AND OPERATION of the Dolomite Products Co., Inc., Rochester, N. Y., at Penfield, just east of Rochester, were described in detail in ROCK PRODUCTS, September 29, 1929, soon after the plant started operation.

In opening up the Penfield quarry it was necessary, in order to gain easy access to the dolomite deposit, to divert to a new channel a creek flowing through the property. With this done, the operators were ready to begin stripping off about 12 ft. of overburden. The overburden was then loaded out by one gas-electric and one straight electric shovel. The old creek channel offered a convenient dump for material stripped off the deposit and the average haul for that purpose was about 1000 ft. one way.



One of the tractor-trucks for transporting strippings

Hauling Problem

The ground was frozen when stripping operations began and three ordinary 6-wheel motor trucks were used to good advantage in hauling the overburden away over a fairly smooth surface. Upon thawing, however, the ground surrounding the operations became so muddy and rough that the trucks became mired frequently. They often had to be extricated by means of a cable run out from one of the power shovels.

After many tie-ups of this sort, it became apparent that further operation with the trucks was out of the question. Horse-drawn dump wagons seemed the logical alternative. Ten teams were hired, each hauling a dump wagon carrying about one yard of dirt, loose measurement. When the shovels were able to load sufficient material, each team was capable of making about five trips an hour and they were used 9 hours daily.

As the work progressed, however, the mire became deeper and the terrain more uneven, particularly in the old creek channel where the material was dumped and where there was still a considerable amount of standing water. Teaming under these conditions became more and more difficult and it was soon necessary to discontinue this type of hauling, because of the frequent tying-up of operations.

As the next expedient, two Linn tractors were hired from a Rochester contractor. A few days of such operation made it clearly apparent that the tractors were well adapted to do this work. It was decided almost immediately to purchase two such tractors for regular use in opening up other quarries and gravel pits where alternative methods of hauling should prove impractical.

Experience with Tractors

One Model 24-B and one Model 25-D Linn tractor, both 4-cylinder, 75-hp. units, were purchased from a contractor in New Jersey who had used them 24 hours a day for three years and, in spite of this continuous service, the machines were in good operating condition when received. Each has a plank body and is equipped with a hoist for rear dumping. The flexible track arrangement used in place of rear wheels permits going through mud and over extremely rough terrain where ordinary wheels sink in. The front wheels are equipped with ordinary hard-rubber tires.

The tractors were put to work at once on the opening-up job at Penfield and their ability to go through nearly any combination of water, mud and uneven ground permitted stripping operations to be resumed at full force. Loading was usually accomplished, as before, with the tractor standing on the grade line above the excavation so that there were no steep grades to pull in

*Based on information and data furnished by the A. C. Nielson Co., industrial surveys, in collaboration with A. T. Neely, superintendent, Penfield Plant, Dolomite Products Co.

Looking down into the quarry opening

Showing the nature of the topsoil of the new quarry

coming away from the pit. Hauling was frequently interrupted for long periods of time because of necessity for blasting and moving the shovels but, when supplied with sufficient material, each tractor was capable of hauling five 4-yd. (loose) loads an hour. On this basis, the two tractors handled about 360 cu. yd. of dirt in a 9-hour day, doing the work of 8 teams and wagons.

Drilling in the stripped area

The material hauled varied from fine dirt to large boulders, probably averaging about 2,750 lb. per yd. as loaded. The trucks traveled faster than the teams but lost a little time in dumping due to the necessity for stopping and elevating the front end of the body, whereas the teams had usually driven through and dumped without stopping. Each type of conveyance was thus capable of making about five trips an hour on the average. With the aid of the Linn tractors the stripping of this quarry was completed in about 75 working days.

With body weights included the total weight on the Linn tractors under load was about seven tons and the haulage, in 45 trips, averaged 72.5 ton-miles per day, gross, or 46.9 ton-miles net, considering the payload alone.

Comparative Operating Costs

As it is apparent that the use of ordinary trucks is highly impracticable for this type of hauling, a cost comparison between them and the Linn units would be of little value. A cost comparison between teaming and hauling with Linn tractors is more logical and may be of some interest. Such a comparison is shown in an accompanying table.

The Linn units were purchased after 3 years of service elsewhere. Depreciation is figured on the basis of 4,050 working hours. Interest, license, insurance and taxes are also included.

The user's maintenance and repair experience to date covers a comparatively short operating period and sufficient facts are not available to indicate exactly what the true upkeep costs will be. An estimated allowance of $0.60 per working hour has been made for each of the machines in use on this job.

The total of the above described items, designated in the table as the hourly fixed and upkeep costs, is $1.78 per working hour or $16.02 per 9-hour day.

Gasoline requirements for the tractors on quarry stripping have averaged 20 gal. per day. Oil and grease costs are estimated from experience to date, the period having been sufficient to indicate what may be expected in these items. The front tires of the Linn tractors are believed to be good for not less than one year of service and their cost is included on that basis. The last item, driver's wages, is set up at the rate of $0.55 per hour for a 9-hour day.

The total of the above-mentioned items is $25.40 per day for each Linn tractor. The average movement on this job was 180 yd. per tractor-day and the cost per yard is shown as $0.141. The cost per net ton-mile was $0.54.

Eight horse-drawn wagons of 1-yard size would be required to do what was accomplished by two tractors. As a matter of fact, 10 teams might have been needed under some conditions. Using eight to assure conservative comparison, however, it appears that the total daily cost would be $64 with teams and the cost per yard of material $0.178.

Savings Effected

The present unit hauling cost of $0.141 per yd. represents a cost reduction of 20.8% as compared with the average figure formerly experienced. The saving is $0.037 per yd. of material moved or $13.32 per day on the average tractor volume of 360 cu. yd. The total savings creditable to the two Linn tractors during the period of 75 days on this work is thus $999. A year of operation at this rate would net $3,996, which is equivalent to a return of 44.4% annually on the total first cost of two machines.

Having completed the stripping work at Penfield quarry, the Linn tractors are now being used on a similar job on some gravel property owned by the same company, nearby. Quick and easy maneuverability combined with the ability to work steadily regardless of ground and weather conditions are the outstanding features of Linn equipment in the experience of Dolomite Products Co. It is difficult to evaluate the gains made as a result of being able to push stripping operations through on schedule with Linn equipment, but the point is of major importance.

OPERATING COSTS ON ONE 4-CYL., 75-HP. LINN TRACTOR* (MODEL 4-25-D) IN QUARRY STRIPPING WORK

Investment Data:	
One rebuilt tractor, complete, at present-day prices	$4,500.00
Less tires	100.00
Without tires	$4,400.00
Less estimated turn-in value	450.00
Net depreciating investment	$3,950.00
Hourly Fixed and Upkeep Costs:	
Depreciation—$3950 ÷ 4050 hr. total life	$ 0.98
Average interest at 6%	.07
Straight interest at 6% on turn-in value	.01
License, taxes and insurance	.12
Maintenance and repairs (parts and labor)	.60
Total per hour	$ 1.78
Operating Costs per 9-Hour Day:	
Fixed and upkeep costs—$1.78 per hr. × 9	$ 16.02
Gasoline—20 gal. per day at $0.15	3.00
Oil and grease	1.10
Tires — 1 set per year at $100 ÷ 300 days	.33
Driver's wages—9 hr. at $0.55	4.95
Totals:	
Per day	$ 25.40
Per working hour	2.82
Per net ton-mile	.54
Per yard of material removed	.141
Alternative Costs with Teams:	
Per day—For 8 teams doing equivalent work—8 at $8 per day, with drivers	$ 64.00
Per yard of material—$64 ÷ 360 yd.	.178
Savings Effected by Tractors:	
Per yard—($0.178—$0.141) (20.8%)	$ 0.037
Per day—$0.037 × 360 yd. (two tractors)	13.32
Total for job—$13.32 × 75 days	999.00
Per year, at above rate—$999 × 300/75	3,996.00
Annual return on investment in two tractors	44.4%

*NOTE: Linn tractors of current models have 6-cylinder motors rated at 100 hp. each, larger body capacity and generally improved construction throughout. Their volume of work is proportionately greater.

A New A. S. T. M. Committee on Mortars for Unit Masonry

AFTER CAREFUL STUDY of a suggestion from the Southern California District Committee of the American Society for Testing Materials and consultation with a number of standing committees interested in the subject, the executive committee has decided to organize a new standing committee on mortars for unit masonry. In making the announcement, the official *Bulletin* of the society states: "The subject is one of particular importance, and while some phases of the problem are being studied by certain committees of the society, there is no single committee in which the problem, as a whole, is being or can logically be studied. The following committees have been consulted: C-1 on Cement; C-3 on Brick; C-7 on Lime; C-9 on Concrete and Concrete Aggregates; C-10 on Hollow Masonry Building Units, and C-11 on Gypsum. Several of these committees deal with materials that enter into the making of mortar, whereas others are concerned with the problem from the viewpoint of the use of mortar with masonry units. There is general agreement that the quality of mortar is of great importance in determining the strength and integrity of masonry structures. The importance of considering mortar in relation to masonry units is emphasized by several committees."

New Machinery and Equipment

New Master Switch

A NEW master switch, type NT, the function of which is to regulate the control circuits of a magnetic contactor controller, and intended for use on cranes, hoists, ore bridges, steel mill machinery and other applications where full speed control from the master switch is desired, is announced by the Electric Controller and Manufacturing Co., Cleveland, Ohio. The design of the device incorporates several features for smooth and easy operation such as ball-bearing mounting, and a machined track on which the roller-type centering device rides.

Master switch for regulating control circuits of contactor controller

The width of the new switch has been confined so that when several are mounted in the crane cage, the operator can reach and operate them conveniently. Other features are the straight line lever operation, the short throw of the handle and the upright or inverted position.

As shown, this master switch is entirely enclosed by heavy gage steel cover and is arranged for conduit connection. Both the contacts and contact fingers are of improved design and easily renewable.

The type NT master switches are built to give a maximum of six points of speed control in each direction with overload reset at the "off" position. Master switches for 4, 5 or 6 points of speed control are identical, the only difference being the location of the arm stops. Since these stops are merely screwed into the main frame, they can be readily changed in the field to provide any one of these number of points of speed control.

Fine Mesh Screen Cloth of Manganese Steel

DEVELOPMENTS of a fine-mesh screen cloth for use in grading fine, abrasive materials is announced by the Manganese Steel Forge Co., Philadelphia, Penn.

The new screen cloth, made of "Rol-Man" drawn manganese-steel wire, is woven with a double-crimp type of mesh, and the manufacturer states that the unusual strength of the drawn manganese-steel wire gives an exceptionally live and resilient screening surface that produces highly efficient and thorough screening action. This resiliency, it is claimed, is maintained throughout the life of the screen and, it is said, the new screen cloth does not become flabby nor develop any "dead spots"

The "Rol-Man" fine-mesh screen cloth is available in sizes from 2-mesh down to 16-mesh, with square or rectangular openings, and in various wire diameters. It can be furnished in rolls 50 ft. and longer, and 24, 36, 48 or 52 in. wide, or can be cut to order in practically any specified widths and lengths.

It is claimed that the manganese steel used in these screens has an ultimate tensile strength of 140,000 to 160,000 lb. per sq. in., a shearing strength of 100,000 to 110,000 lb. per sq. in., and an elongation of 35% to 50% in 2 in., while carbon steel has an ultimate tensile strength of 70,000 lb. per sq. in., a shearing strength of 70,000 lb. per sq. in., and an elongation of 30% in 2 in.; consequently the manganese steel has eight to ten times the resistance to wear and two and a half times the toughness and strength of carbon-steel wire screens.

Portable Air Hoist

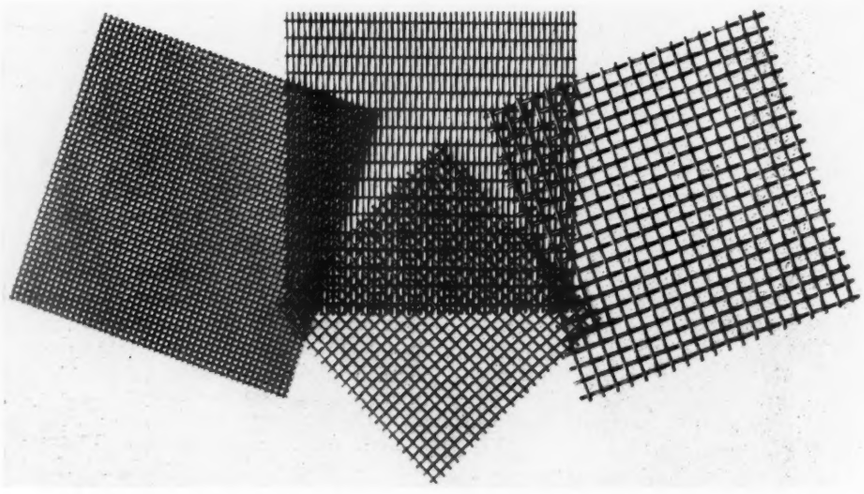
THE INGERSOLL-RAND CO., New York City, has added a new size portable air hoist of 2000 lb. capacity to its line of "Utility" hoists. These hoists, in capacities up to 1500 lb., have been used by miners and contractors for the past three years, and the addition of the 2000-lb. size makes them available for additional classes of work.

The hoist employs a completely enclosed radial, four-cylinder, counterbalanced, reciprocating piston-type air motor, which is reversible. All wearing parts and cylinders are claimed to be easily renewable, and the cylinders interchangeable. The reduction gears between the motor and drum are all machine-

Portable air hoist of 2000 lb. capacity

generated spur gears, completely enclosed in a housing to exclude dust, and operating in semi-fluid grease. Ball and roller bearings are used at all necessary points.

The bronze throttle valve is tapered and fitted into a bronze bushing. A clutch of the



Fine-mesh screen cloth of drawn manganese-steel wire with rectangular or square openings

positive-jaw type is used to disengage the motor. This clutch is thrown out by an eccentric shaft controlled by the clutch lever, which is located on the top of the hoist and automatically locks to hold the clutch either engaged or disengaged. A brake of the bank type wraps the drum at its largest diameter. The operating lever for the brake is conveniently placed and may be adjusted to any one of six operating positions.

Comparatively light in weight, the hoists can be moved about and bolted to a timber or mounted on a post or steel column in any convenient location.

New Convertible Shovel Crane

THE UNIVERSAL POWER SHOVEL CO. division of the Unit Corporation of America, Milwaukee, Wis., announces a new "Unit 512," a distinguishing feature of which is a one-piece gear case which encloses all the operating mechanism of the convertible shovel crane. This one-piece gear case enclosing all the mechanism so that it operates in a continuous bath of oil, is adopted from automobile and truck design, and it is claimed to eliminate much of the work involved in oiling and greasing the shovel mechanism.

Another advantage claimed for the new shovel are new disc clutches so constructed that they can be adjusted at a single point without the assistance of a wrench. It is claimed that ordinary clutches usually require replacement when only one-third of the clutch surface is actually gone, whereas the new type clutch with single-point adjustment assures use of all of the clutch surface, not only making it easier to adjust and operate, but making the clutch facing of longer life. The facing is guaranteed to last a year.

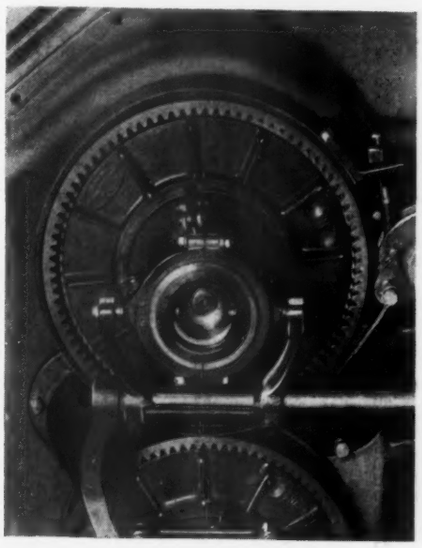
Convertible shovel crane with one-piece gear case and new disc clutches

All of the disc clutches are of uniform standardized size.

The gears in the new unit are mounted directly in ball bearings, and the ball bearings in turn are mounted in a one-piece transmission case to prevent misalignment; the shafting in the gear case is splined and full floating, thus equalizing the torque loads, according to the manufacturer. Misalignment is further prevented by the unit mounting of this transmission case and the power plant on the one-piece turntable to form virtually an integral unit.

In operating the machine the following features are claimed: A special, free-working, split-crowd drum, within reach of the driver's seat, enabling the slack in the crowd lines to be taken up in a few seconds, the operator using only the boom hoist lever and rotating the free-working, special, split-crowd drum. In this operation lifting the boom relieves the normal crowd tension.

The turntable is mounted on rollers equipped with roller bearings. There is a positive independent forward and reverse



Disc type clutches controlled by the pull of a finger

crowd (the result of a special, crowd-line hook-up) for control of the dipper stick.

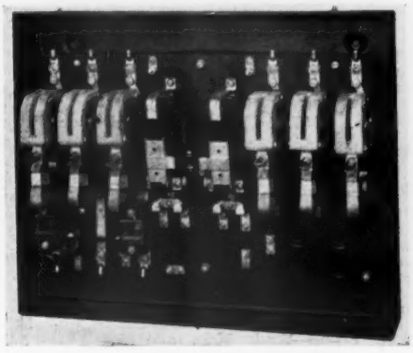
The power plant is a Waukesha VK gasoline motor with governor with 4¼-in. bore, 5-in. stroke, developing 48-hp. at 1400 r.p.m. The power plant equipment includes an air cleaner, American Bosch magneto and pusher type fan for ventilation of the cab.

The machine is convertible to clamshell, dragline, trench hoe, crane or backfiller.

Magnetic Reversing Switch for Large Motors

THE GENERAL ELECTRIC CO., Schenectady, N. Y., announces a new enclosed, magnetic, reversing switch designated CR-7009-B-18, superseding CR-7009-B-5 switch of the same type.

The new device is designed to throw small



Magnetic reversing switch

alternating-current motors directly across the line. It consists of two triple-pole, mechanically interlocked, magnetically operated contactors with restricted-type blowouts, and with a normally-open interlock on each contactor. It also has two hand-reset temperature overload relays. The contactors are mounted side by side on a molded base, instead of back to back as in the previous design. The device is contained in a drawn-shell steel enclosing case.

Maximum horsepower ratings of the new switch are as follows:

Volts	3- and 2-phase 3- or 4-wire	Single-phase
110	7½-hp.	3-hp.
220	15-hp.	7½-hp.
440	15-hp.	10-hp.
550	15-hp.	10-hp.
600	15-hp.	10-hp.

Conveyor Belt of Gigantic Proportions

THE ROBINS CONVEYING BELT CO. recently installed the heaviest and thickest conveyor belt ever used in any industry at the new screening plant of the Michigan Limestone and Chemical Co., Rogers City, Mich.

This limestone operation supplies flux stone for the mills of the United States Steel Corp., and is the largest quarry operation in the world, having an output of from 15,000 to 25,000 tons crushed stone per day.

The belt is of stepped-ply construction, 16 plies at the side and 14 plies at the cen-

Conveyor belt shipped in three separate rolls, each weighing 21,000 lb.

ter, with a top cover 13/32 in. thick and uses 42-oz. duck. The total thickness is 1¾ in. and requires a special tandem drive using 84-in. pulleys that are independently driven by 250-hp. motors.

The conveyor has a center-to-center length of 700 ft. and a lift of 147 ft., making it necessary to ship the belt in three separate rolls weighing 21,000 lb. each. The belt was spliced in the field with a vulcanizing press to make an endless belt.

This belt handles the discharge product from a 60-in. primary crusher delivering pieces up to 15 in. at rate of 1950 tons per hour.

Special 54-in., Timken roller-bearing idlers were designed by Robins engineers for this belt. These idlers have malleable iron brackets, cast-iron pulleys and end lubrication to all bearings.

The Rock Products Market

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Asbury Park, Farmingdale, Spring Lake and Wayside, N. J.	.48	.48	1.15	1.25	1.40	.....
Attica and Franklinville, N. Y.	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.25	1.15	1.75	.....	1.75	1.75
Buffalo, N. Y.	1.00	1.05	1.05	1.05	1.05	1.05
Burnside, Conn.	.75*	.75*	.....	.....	.....	.....
Erie, Penn.	.75	.95	1.40	1.40	.....	.....
Machias Junction, N. Y.	.65	.65	.65	.....	.65	.65
Milton, N. H.	.....	.....	1.75	.....	1.25	1.00
Montoursville, Penn.	1.00	.70	.75	.50	.40	.40
Northern New Jersey	.50	.50	1.00–1.25	1.00–1.25	1.00–1.25	.....
South Portland, Me.	.....	1.25	2.75	2.50	2.50	2.50
Washington, D. C.	.55	.55	1.20	1.20	1.00	1.00
CENTRAL:						
Algonquin, Ill.	.60	.30	.30	.40	.40	.40
Appleton, Minn.	.....	.50	1.25	.....	1.50	.....
Attica, Ind.	.....	.....	All sizes .75–.85			
Barton, Wis.	.....	.40	.50	.60	.60	.60
Cincinnati, Ohio	.55	.55	.80	.80	.80	.80
Crystal Lake, Ill.	.30	.15	.25	.30	.30	.40
Des Moines, Iowa	.40– .60	.60– .80	1.50–1.70	1.50–1.70	1.50–1.70	1.50–1.70
Eau Claire, Wis.	.40	.40	.55	.85	.85	.....
Elkhart Lake and Glenbeulah, Wis.	.60	.30	.50	.50	.50	.50
Grand Rapids, Mich.	.....	.50	.....	.80	.80	.70
Hamilton, Ohio	.65– .75	65.– .75	.65– .75	.65– .75	.65– .75	.65– .75
Hersey, Mich.	.....	.50	.....	.....	.70	.70
Humboldt, Iowa	.40– .50	.40– .50	1.10–1.30	1.10–1.30	1.10–1.30	1.10–1.30
Indianapolis, Ind.	.50.– .60	.25– .60	.40– .60	.45– .75	.45– .75	.45– .75
Kalamazoo, Mich.	.....	.80	1.05	1.05	1.05	1.05
Kansas City, Mo.	.70	.70	.....	.....	.....	.....
Mankato, Minn.	.55	.45	1.25	1.25	1.25	.....
Mason City, Iowa	.50	.50	.85	1.25	1.25	1.25
Milwaukee, Wis.	.....	.86	.86	.96	.96	.96
Minneapolis, Minn.	.35	.35	1.25	1.35	1.35	1.25
St. Paul, Minn. (e)	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Urbana, Ohio	.65	.55	.65	.65	.65	.65
Waukesha, Wis.	.....	.45	.60	.60	.65	.65
Winona, Minn.	.40	40	.50	1.10	1.00	1.00
SOUTHERN:						
Brewster, Fla.	.40	.40	.....	.....	.....	.....
Charleston, W. Va.	.70	1.25	1.25	.....	.....	.....
Eustis, Fla.	.....	.40– .50	.....	.....	.....	.....
Fort Worth, Texas	.75	.75	1.00	1.00	1.00	1.00
Knoxville, Tenn.	.60–1.00	.80–1.10	.....	.....	1.20	1.20
Roscland, La.	.20	.20	.70	.70	.60	.....
WESTERN:						
Los Angeles, Calif.	.10– .40	.10– .40	.20– .90	.50– .90	.50– .90	.50– .90
Oregon City, Ore.	3.00–3.50g	1.00–1.50	1.00–1.50	1.00–1.50	1.00–1.50	1.00–1.50
Phoenix, Ariz.	1.25*	1.15*	1.50*	1.15*	1.15*	1.00*
Pueblo, Colo.	.80	.60	.....	1.20	1.15	1.15
Seattle, Wash.	1.25*	1.25*	1.00*	1.00*	1.00*	1.25*

*Cu. yd. ‡Delivered on job by truck. (e) Prices f.o.b. N. P. Ry.

Core and Foundry Sands

Silica sand quoted washed, dried, screened unless otherwise stated; per ton f.o.b. plant.

City or shipping point	Molding, fine	Molding, coarse	Molding brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.00	2.00	2.25	1.50	.....	4.00	.....
Cheshire, Mass.	Sand for soap, 7.00–8.00					6.00–8.00	.....
Eau Claire, Wis.	.....	.....	.....	.....	.....	2.50–3.00	.....
Elco, Ill.	Soft amorphous silica, 92%–99% thru 325 mesh, 18.00–40.00 per ton						
Kasota, Minn.	.....	.....	.....	.....	.....	.....	1.00
Montoursville, Penn.	.....	.....	.....	1.35–1.50	.....	.....	.....
New Lexington, Ohio	1.75–2.00	1.25–1.50	.....	.....	.....	.....	.....
Ohlton, Ohio	1.75*	1.75*	.....	2.00*	1.75*	1.75*	.....
Ottawa, Ill.	1.25–3.25	2.25–3.50	1.25–3.25	1.25–3.25	1.25	3.50	3.50
Red Wing, Minn. (a)	.....	.....	.....	.....	1.50	3.00	1.50
San Francisco, Calif.	3.50†	5.00†	3.50†	2.50–3.50†	5.00†	3.50–5.00†	.....

†Fresh water washed, steam dried. *Damp. (a) Filter sand, 3.00.

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio	.....	1.50
Eau Claire, Wis.	4.30	1.00
Montoursville, Penn.	.....	1.00
Ohlton, Ohio	1.75	1.75
Ottawa, Ill.	1.25–3.25	1.25
Red Wing, Minn.	.....	1.00
San Francisco, Calif.	3.50	3.50
Silica, Va.	.....	1.75

Glass Sand

(Silica sand is quoted washed, dried and screened)

Cheshire, Mass., in carload lots	5.00–7.00
Klondike, Mo.	2.00
Ohlton, Ohio	2.50
Ottawa, Ill.	1.25
Red Wing, Minn.	1.50
San Francisco, Calif.	4.00–5.00
Silica and Mendota, Va.	2.50–3.00

Bank Run Sand and Gravel

Appleton, Minn.†	.55
Algonquin, Ill.¶ (½-in. and less)	.30
Brewster, Fla. (sand, ¼-in. and less)	.40– .50
Burnside, Conn. (sand, ¼-in. and less)	.75*
Chicago, Ill., and Grand Haven, Mich.†	.92–1.20
Crystal Lake, Ill.¶ (½-in. and less)	.25
Des Moines, Ia. (sand and gravel mix)	.60–1.05
Fort Worth, Tex.¶ (2-in. and less)	.65
Gainesville, Tex.¶ (1-in. and less)	.55
Gary and Miller, Ind.†	1.15–1.40a
Grand Rapids, Mich.¶ (1-in. and less.)	.55
Hamilton, Ohio¶ (1½-in. and less)	.50–1.00
Hersey, Mich.¶ (1-in. and less)	.50
Kalamazoo, Mich.	1.85b
Mankato, Minn.†	.70
Oregon City, Ore.—All sizes at bunkers	1.00–1.50
Pueblo, Colo.—†River run sand	.50
Winona, Minn.†	.60
York, Penn. Sand, ¼-in. and less, 1.00; 1/10-in. down	1.10

*Cubic yard. †Fine sand. 1/-10-in. down. (a) Cu. yd., delivered Chicago. (b) 1½ cu. yd. ¶Gravel.

Current Price Quotations

ROCK PRODUCTS solicits volunteers to furnish accurate price quotations.

Portland Cement

	F.o.b. city named Per Bag	Per Bbl.	High Early Strength
Albuquerque, N. M.	.82½	3.30	4.30¶
Atlanta, Ga.	.....	2.19†	3.49¶
Baltimore, Md.	.....	2.26†	3.56¶
Berkeley, Calif.	.....	2.14	.....
Birmingham, Ala	.....	1.85†	3.15¶
Boston, Mass.	.47	1.88†	3.27¶
Buffalo, N. Y.	.51¼	2.05†	3.35¶
Butte, Mont.	.90¼	3.61	.....
Cedar Rapids, Ia.	.....	2.23*	.....
Centerville, Calif.	.....	2.14	.....
Charleston, S. C.	.....	a2.29†	3.26¶
Cheyenne, Wyo.	.61½	2.46	.....
Chicago, Ill.	.....	1.95*	3.25¶
Cincinnati, Ohio	.....	2.14*	3.44¶
Cleveland, Ohio	.....	2.04*	3.34¶
Columbus, Ohio	.....	2.12†	3.47¶
Dallas, Texas	.....	†1.90–2.20	3.49¶
Davenport, Iowa	.....	2.14*	.....
Dayton, Ohio	.....	2.14†	3.44¶
Denver, Colo.	.66¼	2.65	.....
Des Moines, Iowa	.48½	1.94	.....
Detroit, Mich.	.....	1.95*	3.25¶
Duluth, Minn.	.....	2.04*	.....
Fresno, Calif.	.....	2.33	.....
Houston, Texas	.....	†2.00–2.30	3.73¶
Indianapolis, Ind.	.54¾	1.99*	3.29¶
Jackson, Miss.	.....	2.29†	3.59¶
Jacksonville, Fla.	.....	†2.34b	3.26¶
Jersey City, N. J.	.....	2.13†	3.43¶
Kansas City, Mo.	.50½	2.02	3.22¶
Los Angeles, Calif.	.43	1.72	.....
Louisville, Ky.	.55½	2.12–2.15†	3.42¶
Memphis, Tenn.	.....	2.29†	3.59¶
Merced, Calif.	.....	2.01	.....
Milwaukee, Wis.	.....	2.10*	3.40¶
Minneapolis, Minn.	.....	2.27*	.....
Montreal, Que.	.....	1.60‡	.....
New Orleans, La.	.43	1.92†	3.22¶
New York, N. Y.	.50¾	2.03†	3.33¶
Norfolk, Va.	.....	1.97†	3.27¶
Oklahoma City, Okla.	.61½	2.46	3.66¶
Omaha, Neb.	.59	2.36	3.56¶
Peoria, Ill.	.....	2.12*	3.32¶
Pittsburgh, Penn.	.....	1.95*	3.25¶
Philadelphia, Penn.	.....	2.15†	3.45¶
Phoenix, Ariz.	.....	3.51	.....
Portland, Ore.	.....	2.50	.....
Reno, Nev.	.....	2.96†	.....
Richmond, Va.	.....	2.32†	3.62¶
Sacramento, Calif.	.....	2.25	.....
Salt Lake City, Utah	.70¼	2.81	.....
San Antonio, Texas	.....	.....	3.42¶
San Francisco, Calif.	.....	2.24†	.....
Santa Cruz, Calif.	.....	2.10	.....
Savannah, Ga.	.....	†2.29a	3.16¶
St. Louis, Mo.	.48¾	1.95†	3.25¶
St. Paul, Minn.	.....	2.27*	.....
Seattle, Wash.	.....	1.75–1.90	.....
Tampa, Fla.	.....	2.00†	3.41¶
Toledo, Ohio	.....	2.20*	3.50¶
Topeka, Kan.	.55¼	2.21	3.41¶
Tulsa, Okla.	.58¼	2.33	3.53¶
Wheeling, W. Va.	.....	2.02†	3.32¶
Winston-Salem, N.C.	.....	2.44†	3.54¶
Mill prices f.o.b. in carload lots, without bags, to contractors.			
Albany, N. Y.	.....	2.15	.....
Bellingham, Wash.	.....	2.25	.....
Buffington, Ind.	.....	1.70	.....
Chattanooga, Tenn.	.....	2.05	.....
Concrete, Wash.	.....	2.65	.....
Davenport, Calif.	.....	2.05	.....
Hannibal, Mo.	.....	1.90	.....
Hudson, N. Y.	.....	1.85†	.....
Leeds, Ala.	.....	1.65	.....
Limedale, Ind.	.....	1.70	.....
Lime & Oswego, Ore.	.....	2.50	.....
Mildred, Kan.	.....	2.35	.....
Nazareth, Penn.	.....	2.15	.....
Northampton, Penn.	.....	1.75	.....
Richard City, Tenn.	.....	2.05	.....
Steelton, Minn.	.....	1.85	.....
Toledo, Ohio	.....	2.20	.....
Universal, Penn.	.....	1.70	.....

NOTE: Unless otherwise noted, prices quoted are net prices, without charge for bags. Add 40c per bbl. for bags. *Includes dealer and cash discounts. †Includes 10c cash discount. (a) 44c refund for paid freight bill. (b) 38c bbl. refund for paid freight bill. ¶"Incor" Perfected, prices per bbl. packed in paper sacks, subject to 10c discount 15 days. ‡Includes sales tax.

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chazy, N. Y.	.75	1.60	1.60	1.30	1.30	1.30
Farmington, Conn.	.....	1.30	1.10	1.00	1.00	.....
Ft. Spring, W. Va.	.35	1.35	1.35	1.25	1.15	1.00
Jamesville, N. Y.	1.00	1.00	1.00	1.00	1.00	1.00
Oriskany Falls, N. Y.	.50–1.00	1.00–1.35	1.00–1.35	1.00–1.35	1.00–1.35	1.00–3.00
Prospect Junction, N. Y.	.50– .80	1.15u	1.15	1.10	1.10	1.10
Rochester, N. Y.—Dolomite	1.50	1.50	1.50	1.50	1.50	1.50
Hillsville, Penn.	.85	1.35	1.35	1.35	1.35	1.35
Shaw's Junction, Penn. (e)	.85	1.20–1.35	1.20–1.35	1.20–1.35	1.40	1.30–1.35
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Alton, Ill. (b)	2.00	.....	2.00	.....	.....	.....
Afton, Mich.	.....	.....	.....	.25	.50– .75	1.50
Cypress, Ill.	.90	.90	.90	.90	1.00	1.15
Davenport, Iowa	1.00	1.50	1.50	1.30	1.30	1.30
Dubuque, Iowa	1.00	1.10	1.10	1.10	1.10	.....
Dundas, Ont.	.50	.80	.80	.70	.70	.....
Stolle and Falling Springs, Ill.	1.05–1.70	.95–1.70	1.15–1.70	1.05–1.70	1.05–1.70	.....
Greencastle, Ind.	1.25	1.10	1.10	1.00	1.00	1.00
Lannon, Wis.	.80	1.00	1.00	.80	.80	.80
McCook, Ill.	.80	1.00	1.00	1.00	1.00	1.00
Montreal, Canada	.75–1.00	1.65–1.85	1.45	1.15	1.05	.95
Sheboygan, Wis.	1.00	1.00	1.00	1.00	1.00	1.00
Stone City, Iowa	.75	.....	1.10	1.00	1.00	1.00h
Toledo, Ohio	1.60	1.70	.....	1.60	.....	1.60
Toronto, Canada	2.50	2.50	2.50	2.50	2.50	2.50
Waukesha, Wis.	.....	.90	.90	.90	.90	.....
Wisconsin points	.50	.....	1.00	.90	.90	.....
SOUTHERN:						
Cartersville, Ga.	1.00	1.50	1.50	1.35	1.00	.90
Chico and Bridgeport, Texas	.50	1.30	1.30	1.25	1.20	.....
Cutler, Fla.	.50r	1.75r	1.75r	1.75r	1.75r	1.50r
El Paso, Texas (v)	.50	1.25	1.25	1.00	1.00	1.00
Graystone, Ala.	Crusher run stone 1.00 per net ton					
Olive Hill, Ky.	.50–1.00	1.00	1.00	.90	.90	.90
Rocky Point, Va.	.50– .75	1.40–1.60	1.30–1.40	1.15–1.25	1.10–1.20	1.00–1.05
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.70
Blue Springs and Wymore, Neb. (t)	.25	.25	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.00	1.25	1.00	1.00	1.00	.....
Richmond, Calif.	.75	.....	1.00	1.00	1.00	.....
Rock Hill, St. Louis, Mo.	1.45	1.45	1.45	1.45	1.45	1.45
Stringtown, Okla.	.50	1.30	1.30	1.25	1.20	.....

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn. (q)	1.20	1.60	1.45	1.35	.....	1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	.....
Duluth, Minn.	1.00	2.25	1.75	1.65	1.35	1.25
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Texas	.....	2.00	1.45	1.20	1.15	.....
New Britain, Plainville, Rocky Hill, Wallingford, Meriden, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	.....
Northern New Jersey	1.00–1.40	2.10	1.25–1.90	1.00–1.50	1.00–1.50	.....
Richmond, Calif.	.50	.....	1.00	1.00	1.00	.....
Toronto, Canada	4.70	5.80	4.05	4.05	.....	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Cayce, S. C.—Granite	.50	1.60	1.60	1.60	1.50	1.50
Chicago, Ill.—Granite	2.00	1.70	.....	1.50	1.50	.....
Eastern Pennsylvania—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Pennsylvania—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Lithonia, Ga.—Granite	.50	1.75	1.50	1.25	1.25	.....
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.—Granite	3.00–3.50	.....	2.00–2.25	2.00–2.25	.....	1.25–3.00
Toccoa, Ga.—Granite	.50	1.35	1.35	1.25	1.25	1.20

(a) Limestone, ¼ to ⅛ in., 1.35 per ton; Lime flour, 8.50 per ton. (b) Wagonloads. (c) 1 in., 1.40. (d) 2-in., 1.30. (e) Price net after 10c discount deducted. (h) Rip rap. (n) Ballast, R. R., .90; run of crusher, 1.00. (q) Crusher run, 1.40; ¼-in. granlithic finish, 3.00. (r) Cu. yd. (t) Rip rap, 1.20–1.40 per ton. (u) ⅝-in. and less. (v) Roofing stone, 1.50 per ton.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Allentown, Penn.	1.00–1.50	.40– .60	.80–1.00	.50– .80	.50– .80	.60– .80	.80
Bethlehem, Penn.	1.25–1.75	.50– .70	1.00–1.25	.60– .80	.70– .80	.70– .90	.90
Buffalo, N. Y., Erie and Du Bois, Penn.	2.25	1.25	1.25	1.35	1.25	1.25	1.25
Hokendauqua, Penn.	1.50	.70	1.00	1.15	1.15	1.15	1.15
Reading, Penn.	2.00	1.00	.....	1.00	.....	.....	.....
Swedeland, Penn.	1.50–2.50	.60–1.10	1.00–1.25	.90–1.25	.90–1.25	1.25	1.25
Western Pennsylvania	2.00	1.25	1.25	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	.....	1.30*	1.80*	1.45*	1.45*	1.45*	1.45*
Jackson, Ohio	.....	.65*	1.80*	1.30*	1.30*	1.30*	1.30*
Toledo, Ohio	1.50	1.10	1.35	1.35	1.35	1.35	1.35
SOUTHERN:							
Ashland, Ky.	.....	1.05*	1.80*	1.45*	1.45*	1.45*	1.45*
Ensley and Alabama City, Ala.	2.05	.55	1.25	1.15	.90	.90	.80
Longdale, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.05
Woodward, Ala.†	2.05	.55*	.....	1.15*	.90*	.90*	.....

5c per ton discount on terms. †1¼ in. to ¼ in., 1.05; ⅜ in. to 10 mesh, 1.25*; ⅝ in. to 0 in., 90*; ¼ in. to 10 mesh, .80*.

Agricultural Limestone

(Pulverized)

Alton, Ill.—Analysis, 98% $CaCO_3$; 0% $MgCO_3$, 90% thru 100 mesh	4.50
Belfast, Me.—Analysis, $CaCO_3$, 90.4%; $MgCO_3$, trace; 90% thru 100 mesh, per ton	10.00
Branchton, Penn.—94.89% $CaCO_3$; 1.50% $MgCO_3$, 100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh; per ton	5.00
Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh	1.50
Cartersville, Ga.	2.00
Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, per ton	6.00
Gibsonburg, Ohio—Bulk, 2.25; in bags	3.70
Hillsville, Penn.	2.10–4.50
Joliet, Ill.—Analysis, 50% $CaCO_3$; 44% $MgCO_3$; 90% thru 200 mesh	3.50
Knoxville, Tenn.—Analysis, 52% $CaCO_3$; 36% $MgCO_3$; 80% thru 100 mesh, bags, 3.75; bulk	2.50
Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton	2.00
Middlebury, Vt.—Analysis, 99.05% $CaCO_3$; 90% thru 50 mesh	4.25
West Rutland, Vt. — Analysis, 96.5% $CaCO_3$; 1% $MgCO_3$, in 100-lb. burlap bags, per ton	4.50

Agricultural Limestone

(Crushed)

Bedford, Ind.—Analysis, 98% $CaCO_3$; 1% $MgCO_3$; 90% thru 10 mesh	1.50
Cartersville, Ga.—50% thru 50 mesh	1.50
Chico and Bridgeport, Texas—Analysis, 95% $CaCO_3$; 1.3% $MgCO_3$; 90% thru 4 mesh	1.00
Colton, Calif.—Analysis, 95-97% $CaCO_3$; 1.31% $MgCO_3$, all thru 14 mesh down to powder	3.50
Cypress, Ill.—Analysis, 96% $CaCO_3$; 90% thru 100 mesh, 1.25; 50% thru 100 mesh, 1.25; 90% thru 50 mesh, 1.25; 50% thru 50 mesh, 1.15; 90% thru 4 mesh, 1.25, and 50% thru 4 mesh	1.15
Davenport, Iowa — Analysis, 92-98% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 4 mesh, 50% thru 20 mesh; bulk, per ton	1.10
Dubuque, Ia.—Analysis, 64.04% $CaCO_3$; 29.54% $MgCO_3$; 50% thru 50 mesh	1.00
Dundas, Ont.—Per ton	1.00
Fort Spring, W. Va.—Analysis, 90% $CaCO_3$; 3% $MgCO_3$; 50% thru 50 mesh; bulk, per ton	1.15–1.25
Gibsonburg, Ohio—90% thru 10 mesh	1.00–1.50
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh, sacked	5.00
Jamesville, N. Y.—Analysis, 89% $CaCO_3$; 4% $MgCO_3$; 90% thru 100 mesh; in paper bags, 5.10; bulk	3.85
Lannon, Wis. — Analysis, 54% $CaCO_3$ 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio—90% thru 100 mesh	3.00
90% thru 50 mesh	2.00
90% thru 4 mesh	1.00
McCook and Gary, Ill.—Analysis, 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 4 mesh	.80
Olive Hill, Ky.—90% thru 4 mesh	.50
Rocky Point, Va.—50% thru 200 mesh, bulk, in carloads, 2.00; 100-lb. paper bags, 3.25; 200-lb. burlap bags	3.50
Stolle and Falling Springs, Ill.—Analysis, 89.9% $CaCO_3$, 3.8% $MgCO_3$; 90% thru 4 mesh	1.15–1.70
Stone City, Iowa — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
West Stockbridge, Mass.* — Analysis, 95% $CaCO_3$; 90% thru 100 mesh, bulk 100-lb. paper bags, 4.75; 100-lb., cloth	3.50 5.25
Waukesha, Wis.—90% thru 100 mesh, 3.65; 50% thru 100 mesh	2.10

*Less 25c cash 15 days.

Pulverized Limestone for Coal Operators

Davenport, Iowa—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; sacks, ton	6.00
Hillsville, Penn., sacks, 5.10; bulk	3.50
Joliet, Ill.—Analysis, 50% $CaCO_3$; 44% $MgCO_3$; 90% thru 200 mesh (bags extra)	3.50
Rocky Point, Va.—Analysis, 97% $CaCO_3$; 75% $MgCO_3$; 85% thru 200 mesh, bulk	2.25–3.50
Waukesha, Wis.—85% thru 200 mesh, bulk	4.00

Lime Products

(Carload prices per ton f.o.b. shipping point unless otherwise noted)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime In bulk	Lump lime In bbl.
EASTERN:								
Berkeley, R. I.	.....	.....	11.40	.....	.....	17.50	.....	20.65
Buffalo, N. Y.	.....	.....	.....	12.00	.....	.....	.....	.....
Knickerbocker, Devault and Rambo, Penn.*	.....	9.50	9.50	9.50	8.00	9.50	8.50	.....
Lime Ridge, Penn.	.....	.....	8.75	.....	6.50	8.00[3]	5.00	.....
CENTRAL:								
Afton, Mich.	.....	.....	.....	.....	.....	10.00	6.50	.....
Carey, Ohio	9.50	6.50	6.50	.....	8.00	.....	8.00	.....
Cold Springs, Ohio	.....	7.75	7.75	.....	.....	.....	7.00	.....
Gibsonburg, Ohio	10.50	.....	.....	.....	7.00	9.00[9]	7.50	.....
Huntington, Ind.	.....	6.50	6.50	.....	.....	.....	.....	.....
Little Rock, Ark.	.....	14.40	.....	14.40	.....	.....	11.90	.....
Luckey, Ohio*	10.50	7.75	7.75	.....	.....	.....	7.00	.....
Marblehead, Ohio	.....	6.50	6.50	.....	.....	.....	7.00	.....
Milltown, Ind.	.....	9.00	8.25	9.50	7.50	.....	7.00	.....
Scioto, Ohio	10.50	6.50	6.50	7.50	7.00	.....	6.00	15.00
Sheboygan, Wis.	.....	10.50	10.50	.....	.....	.....	9.50	9.50
Tiffin, Ohio	.....	.....	.....	.....	8.00	10.00	.....	.....
Wisconsin points	.....	11.50	.....	.....	.....	.....	9.50	.....
Woodville, Ohio	10.50	7.75	7.75	11.50[24]	7.00	9.00[9]	7.00	.....
SOUTHERN:								
Cartersville, Ga.	.....	9.00	.....	.....	.....	13.50	.....	15.00
Graystone, Ala.*	12.50	9.00	.....	12.50	.....	.....	7.50	.....
Keystone, Ala.	.....	9.00	.....	9.00	.....	.....	7.50	.....
Knoxville, Tenn.	10.50	7.00– 9.00	7.00– 9.00	7.00	.....	.....	4.75‡	10.50¶
Ocala, Fla.	.....	11 00	.....	.....	.....	.....	.....	.....
Pine Hill, Ky.	.....	9.00	8.00	9.00	.....	.....	.....	12.50
WESTERN:								
Colton, Calif.	.....	.....	.....	.....	9.50[4]	.....	.....	.....
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	12.50	20.00
Los Angeles, Calif.	.....	.....	.....	.....	.....	.....	12.00	.....
San Francisco, Calif.†	16.00	14.00	6.00–12.00	14.00–19.00	14.50[20]	.....	11.00[19]	.....
San Francisco, Calif.	19.00	14.00–17.00	12.50	14.00–19.00	14.50[20]	.....	11.00[19]	.....

[1]Also 6.00. [2]To 1.35. [3]In 100-lb. bags. [4]To 11.85 per ton, granular but not ground, ¼-in. screen down to 14 mesh. [9]In 80-lb. paper. [10]Per bbl. [17]Less credit for return of empties. [19]To 14.50. [20]Also 13.00. [24]Superfine, 92.25% thru 200 mesh. *Price to dealers. †Wood-burnt lime: finishing hydrate 20.00 per ton, pulverized lime 2.00 per iron drum. Oil-burnt pulverized lime, 13.00–14.50 per ton. ‡To 6.00. ¶To 13.50.

Wholesale Prices of Slate

Prices given are f.o.b. at producing point or nearest shipping point

Slate Flour

Pen Argyl, Penn.—Screened, 100% thru 200 mesh, 7.00 per ton in paper bags.

Slate Granules

Esmont, Va.—Blue, $7.50 per ton.
Granville, N. Y.—Red, green and black, $7.50 per ton.
Pen Argyl, Penn.—Blue-black, 6.50 per ton in bulk, plus 10c per bag.

Roofing Slate

Prices per square—Standard thickness.

City or shipping point:	3/16-in.	¼-in.	⅜-in.	½-in.	¾-in.	1-in.
Arvonia, Va.—						
Buckingham oxford grey	13.88	17.22	24.99	29.44	34.44	45.55
Bangor, Penn.—No. 1 clear	10.50–14.50	24.50	29.00	33.50	44.50	55.60
No. 1 ribbon	9.00–10.25	20.00	24.50	29.00	40.00	51.25
Gen. Bangor No. 2 ribbon	6.75– 7.25	.....	.....	.....	.....	.....
Gen. Bangor mediums	9.50–11.25	.....	.....	.....	.....	.....
Chapman Quarries, Penn.	7.75–11.25	13.00–15.00	19.00–22.00	23.00–28.00	27.00–30.00	32.00–35.00
Granville, N. Y.—						
Sea green, weathering	14.00	24.00	30.00	36.00	48.00	60.00
Semi-weathering, green & gray	15.40	24.00	30.00	36.00	48.00	60.00
Mottled purple & unfading gr'n	21.00	24.00	30.00	36.00	48.00	60.00
Red	27.50	33.50	40.00	47.50	62.50	77.50
Monson, Maine	19.80	24.00	.....	.....	.....	.....
Pen Argyl, Penn.*						
Graduated slate (blue)	.....	16.00	23.00	27.00	37.00	46.00
Graduated slate (grey)	.....	18.00	25.00	29.00	39.00	48.00
Color-tone	11.50–12.50; Vari-tone, 12.00–13.00; Cathedral gray, 14.00–15.00					
No. 1 clear (smooth text)	7.25–10.50; No. 1 clear (rough text), 8.25–9.50					
Albion-Bangor medium	8.00–9.00; No. 2 clear, 8.00–9.00; No. 1 ribbon, 8.00–8.50					
Slatedale and Slatington, Penn.—						
Genuine Franklin	11.25	22.00	26.00	30.00	40.00	50.00
Blue Mountain No. 1	10.50	22.00	26.00	30.00	40.00	50.00
Blue Mountain No. 1 clear	9.50	18.00	22.00	26.00	36.00	46.00
Blue Mountain No. 2 clear	8.00	18.00	22.00	26.00	36.00	46.00

(a) Prices are for standard preferred sizes (standard 3/16-in. slates), smaller sizes sell for lower prices.
(b) Prices other than 3/16-in. thickness include nail holes.
(c) Prices for punching nail holes, in standard thickness slates, vary from 50c to $1.25 per square.
*Unfading grey, 14.00–15.00; 10% disc. to roofer; 10%–8⅓% to wholesaler.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:
- Crude talc, per ton 5.00
- Ground talc (20-50 mesh), bags 6.50
- Ground talc (150-200 mesh), bags 9.00
- Pencils and steel crayons, gross 1.50– 2.00

Chester, Vt.—Finely ground talc (carloads), Grade A—99-99¾% thru 200 mesh, 8.00–8.50; Grade B, 97-98% thru 200 mesh 7.50– 8.00
1.00 per ton extra for 50-lb. paper bags; 166⅔-lb. burlap bags, 15c each; 200-lb. burlap bags, 18c each. Credit for return of bags. Terms 1%, 10 days.

Clifton, Va.:
- Crude talc, per ton 4.00
- Ground talc (150-200 mesh), in bags .. 12.00

Conowingo, Md.:
- Crude talc, bulk 4.00
- Ground talc (150-200 mesh), in bags .. 14.00
- Cubes, blanks, per lb ..... .10

Emeryville, N. Y.:
- Ground Talc (200 mesh), bags 13.75
- Ground talc (325 mesh), bags 14.75

Hailesboro, N. Y.:
- Ground talc (300-350 mesh) in 200-lb. bags 15.50–20.00

Henry, Va.:
- Crude (mine run) 3.50– 4.50
- Ground talc (150-200 mesh), bags 6.25– 9.50

Joliet, Ill.:
- Ground talc (200 mesh) in bags:
- California white 30.00
- Southern white 20.00
- Illinois talc 10.00

Los Angeles, Calif.:
- Ground talc (150-200 mesh), in bags .. 14.00–25.00

Natural Bridge, N. Y.:
- Ground talc (325 mesh), bags 10.00–15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 65-70% 3.50–4.00
Mt. Pleasant, Tenn.—B.P.L. 76-78% 6.75

Ground Rock
(2000 lb.)

Gordonsburg, Tenn.—B.P.L. 65–70% 3.75– 4.30
Mt. Pleasant, Tenn. — Lime phosphate: B.P.L. 73.25% 11.80
Mt. Pleasant, Tenn.—B.P.L., 72% 5.00– 5.50

Florida Phosphate
(Raw Land Pebble)
(Per Ton)

Mulberry, Fla.—Gross ton, f.o.b. mines
- 68/66% B.P.L. 3.15
- 70% minimum B.P.L. 3.75
- 72% minimum B.P.L. 4.25
- 75/74% B.P.L. 5.25
- 77/76% B.P.L. 6.25

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

Pringle, S. D.—Mine run, per ton 100.00–125.00
- Punch mica, per lb ..... .06
- Scrap, per ton, carloads 20.00

Rumney Depot, Bristol and Cardigan, N. H.—Per ton:
- Punch mica, per ton 150.00–240.00
- Mine scrap 22.50
- Mine run 325.00
- Clean shop scrap 25.00
- Roofing mica 37.50
- Trimmed mica, per ton, 20 mesh, 37.50; 40 mesh, 40.00; 60 mesh, 40.00; 100 mesh, 45.00; 200 mesh 60.00

Spruce Pine, N. C.—Mine scrap, per ton 20.00

Gypsum Products— CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gaging Plaster	Wood Fiber	Gaging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ¼x32x 36". Per M Sq. Ft.	—Plaster Board— ⅜x32x 36". Per M Sq. Ft.	Wallboard, ⅛x32 or 48" Lengths 6'-10'. Per M Sq. Ft.
Acme, Tex.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Blue Rapids, Kan.	1.50–3.00	4.00	4.00	4.00–6.00	4.00–6.00	4.00–6.00	10.00	10.00	19.00	19.00	10.50	10.50	12.00
Centerville, Iowa	.....	.....	6.00	7.00	.....	7.50	8.50	10.50a	.....	.....	.....	.....	.....
East St. Louis, Ill.—Special Gypsum Products—Partition section, 4 in. thick, 12 in. wide, and up to 10 ft. 3 in. long, 12c per ft., 21.00 per ton; outside wall section and interior bearing wall section, 6 in. wide, 6 in. thick, and up to 10 ft. 3 in. long, 25c per ft., 30.00 per ton, floor section, 7 in. thick, 16 in. wide, and up to 13 ft. 6 in. long, 17c per ft., 23.00 per ton.													
Fort Dodge, Iowa	2.50	6.00	6.00	7.00	9.00	9.00	11.50	8.00	16.00	20.00	15.00	.....	25.00
Grand Rapids, Mich. (h)	.....	.....	7.00	9.00	9.00d	9.50d	19.50	8.00d	26.00	20.00d	.....	.....	25.00
Los Angeles, Calif. (b)	.....	7.00–9.00	7.00–9.00	7.50–9.00	8.00–10.00	.....	8.00–10.00	.....	30.00c	.....	.....	.....	.....
Medicine Lodge, Kan.	1.45	.....	.....	.....	11.50d	.....	11.50d	.....	16.00d	11.50d	.....	.....	.....
Oakfield, N. Y.	3.50	9.00	9.00	9.00	9.00	9.00	20.95	6.00	27.35	.....	.....	15.00	25.00
Port Clinton, Ohio	3.00	4.00	6.00	9.00	9.00	9.00	20.00	8.00	25.50	20.00i	.....	15.00	25.00
Portland, Colo.	.....	7.00	7.00	9.00	9.00	9.50	9.00	.....	27.50	.....	22.50	27.50	.....
Providence, R. I. (x)	.....	.....	.....	12.00–13.00e	.....	.....	.....	.....	.....	.....	.....	.....	.....
Seattle, Wash. (z)	6.00	9.00	9.00	13.00	.....	.....	14.00	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	25.00g	33.00f

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable). (a) White molding. (b) Plasterboard, ¼x32x36-in., 14c-17c per sq. ft.; ⅜x32x36-in., 15c-18c per sq. ft. (c) To 40.00. (d) Includes paper bags. (e) Includes jute sacks. (f) "Gyproc," ⅜x48-in. by 5 and 10 ft. long. (g) ½x48-by 3 to 4 ft. long. (h) Gypsum lath, per M sq. ft., 15.00. (i) To 26.00. (x) "Fabricaste" gypsum blocks, 2- and 3-in., f.o.b. motor trucks at plant, 7¼c-8¼c. Block setting plaster, per ton, in jute sacks, 12.00. (y) Jute sacks, 18.00; paper sacks, 16.00. (z) Gypsum partition tile, 3-in., 9c per sq. ft.; 4-in., 11c per sq. ft.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon, Vt.—English pink, cream and coral pink	¶12.50–¶14.50	¶12.50–¶14.50
Cranberry Creek, N. Y.—Bio-Spar, per ton in bags in carload lots, 9.00; less than carload lots, 12.00 per ton in bags, bulk, per ton		7.50
Crown Point, N. Y.—Mica Spar		¶9.00–¶12.00
Davenport, Iowa — White limestone, in bags, per ton	¶6.00	¶6.00
Harrisonburg, Va.	12.50–14.50	
Middlebrook, Mo.—Red		20.00–25.00
Middlebury, Vt.—Middlebury white		¶9.00–¶10.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags		c5.50
Phillipsburg, N. J.		16.00–18.00
Randville, Mich.—Crystalite white marble, bulk	4.00	4.00– 7.00
Stockton, Calif. — Colored rock aggregate		6.00–18.00
Tuckahoe, N. Y.—Tuckahoe white	7.00	
Warren, N. H. (d)		¶8.00–¶8.50
Whitestone, Ga.		10.00

¶C.L. ‖L.C.L. (a) Including bags. (b) In burlap bags, 2.00 per ton extra. *Per 100 lb. (c) Per ton f.o.b. quarry in carloads; 7.00 per ton L.C.L. (d) L.C.L., 9.50–15.00 ton in 100-lb. bags.

Soda Feldspar

De Kalb Jct., N. Y.—Color, white; pulverized (bags extra, burlap 2.00 per ton, paper 1.20 per ton); 99% thru 140 mesh, 16.00; 99% thru 200 mesh, per ton	18.00

Potash Feldspar

Auburn and Topsham, Me.—Color white, 98% thru 140 mesh (bulk)	19.00
Keystone, S. D.—Color, white; analysis, K_2O, 13.25%; Na_2O, 2.10%; SiO_2, 64%; Fe_2O_3, .03%; Al_2O_3, 20%, pulverized, 99% thru 200 mesh, in bags, 15.00; bulk	15.00
Crude, in bags, 9.00; bulk	8.00
Coatesville, Penn.—Color, white; analysis, K_2O, 12.30%; Na_2O, 2.86%; SiO_2, 66.05%; Fe_2O_3, .08%; Al_2O_3, 18.89%; crude, per ton	8.00
Erwin, Tenn.—White; analysis, K_2O, 10%; Na_2O, 2.75%; SiO_2, 68.25%; Fe_2O_3, .10%; Al_2O_3, 18.25%, pulverized 98% thru 200 mesh, in bags, 17.20; bulk	16.00
Crude, in bags, 8.50; bulk	7.50
Rumney and Cardigan, N. H. — Color, white; analysis, K_2O, 9-12%! Na_2O, trace; SiO_2, 64-67%; Al_2O_3, 17-18%, crude, bulk	7.00– 7.50
Rumney Depot, N. H.—Color, white; analysis, K_2O, 8-13%; Na_2O, 1-1½%; SiO_2, 62-68%; Al_2O_3, 17-18%, crude, bulk	7.00– 7.50
Spruce Pine, N. C.—Color, white; analysis, K_2O, 10%; Na_2O, 3%; SiO_2, 68%; Fe_2O_3, 0.10%; Al_2O_3, 18%; 99½% thru 200 mesh; pulverized, bulk (bags, 15c extra)	18.00

Cement Drain Tile

Graettinger, Iowa. — Drain tile, per foot: 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .12½; 12-in., .17½; 15-in., .35; 18-in., .50; 20-in., .60; 24-in., 1.00; 30-in. 1.35; 36-in.	2.00
Grand Rapids, Mich.—Drain tile, per 1000 ft.	
4-in.	36.00
5-in.	48.00
6-in.	66.00
8-in.	100.00
10-in.	150.00
12-in.	210.00
Longview, Wash.—Drain tile, per 100 ft.	
3-in.	5.00
4-in.	6.00
6-in.	10.00
8-in.	15.00
Tacoma, Wash.—Drain tile, per 100 ft.	
3-in.	4.00
4-in.	5.00
6-in.	7.50
8-in.	12.00

Chicken Grits

Centerville, Iowa	9.25
Cypress, Ill.—(Agstone)	1.15
Belfast, Me.—(Agstone), per ton, in carloads	10.00
Chico. Tex.—Hen size and Baby Chick, packed in 100-lb. sacks, per ton	10.00
Coatesville, Penn.—(Feldspar), per ton, in bags of 100 lb. each	8.00
Cranberry Creek, N. Y.—Per ton, in carload lots, in bags, 9.00; bulk, 7.50. Less than carload lots, in bags	12.00
Davenport, Iowa — High calcium carbonate limestone, in bags L.C.L., per ton	6.00
El Paso, Texas—(Limestone) per 100-lb. sack	.75
Los Angeles, Calif.—Per ton, including sacks: Gypsum	7.50 –9.50
Middlebury, Vt.—Per ton (a)	10.00
Randville, Mich.—(Marble), bulk	6.00
Seattle, Wash.—(Gypsum), bulk, ton	10.00
Warren, N. H.	8.50– 9.50
Waukesha, Wis.—(Limestone), per ton	7.00
West Stockbridge, Mass.	¶7.50–¶9.00
Wisconsin Points—(Limestone), per ton	15.00

(a) F.o.b. Middlebury, Vt. ¶C.L. ‖L.C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton Wis.	10.50
Dayton, Ohio	12.50–13.50
Detroit, Mich. (d)	13.00–16.00*b
Farmington, Conn.	16.00
Grand Rapids, Mich.*	14.50
Iona, N. J.	12.00
Jackson, Mich.	13.00
Madison, Wis.	12.50a
Milwaukee, Wis.	13.00*
Minneapolis, Minn.	9.00*
Mishawaka, Ind.	11.00
New Brighton, Minn.	8.00
Pontiac, Mich. (e)	15.50
Portage, Wis.	15.00
Rochester, N. Y.	19.75
Saginaw, Mich.	13.50
San Antonio, Texas	12.50
Sebewaing, Mich.	12.50
South River, N. J.	11.00
South St. Paul, Minn.	9.00
Syracuse, N. Y.	18.00–20.00
Toronto, Canada	b13.00–15.00*
Winnipeg, Canada	15.00

Delivered on job. (a) Less 50c disc. per M 10th of month. (b) 5% disc., 10 days. (c) Delivered in city. (d) Also 15.50. (e) Truck delivery.

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point.

City or shipping point	Size 8x8x16
Appleton, Minn.	18.00–20.00
Chicago, Ill., district: 8x8x16. Per 1000	180.00
Chicago, Ill.:	
8x 8x16. Each	.21†
8x 8x16. Each	.18b
8x10x16. Each	.26†
8x10x16. Each	.23b
8x12x16. Each	.30†
8x12x16. Each	.27b
Columbus, Ohio	14.00b–16.00†
Forest Park, Ill.	21.00*
Graettinger, Iowa	.18– .20
Indianapolis, Ind.	.10– .12a
Lexington, Ky.:	
8x8x16	a18.00*
8x8x16	c13.00*
Los Angeles, Calif.:	
4x8x12	4.50*
4x6x12	3.90*
4x4x12	2.90*

*Price per 100 at plant
†Rock or panel face.
(a) Face. (b) Plain. (c) Common.

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Clyde, Ill.—French tile, 9x15-in., per sq., 9.50–¶1.50; Spanish, 9x15-in., per sq., 10.00–12.00; Shingle, 9x12-in., per sq.	11.00–13.00
Detroit, Mich.—5x8x12, per M	67.50
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00
Lexington, Ky.—8x15, per sq.:	
Red	15.00
Green	18.00
Longview, Wash.:	
4x6x12-in., per 1000	55.00
4x8x12-in., per 1000	65.00

Cement Building Tile

Chicago District (Haydite):	
8x 4x16, per 1000	140.00
8x 8x16, per 1000	200.00
8x12x16, per 1000	300.00
Columbus, Ohio:	
5x8x12, per 100	6.00
Lexington, Ky.:	
5x8x12, per 100	7.50
4x5x12, per 100	4.00
Longview, Wash. (Stone Tile):	
4x6x12, per 1000	57.50
4x8x12, per 1000	65.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Camden & Trenton, N. J.	17.00	
Chicago District "Haydite"	14.00	
Columbus, Ohio	16.00	17.00
Ensley, Ala. ("Slagtex")	13.00a	
Forest Park, Ill.		37.00
Longview, Wash.	16.50	23.00– 40.00
Milwaukee, Wis.	14.00	32.00
Omaha, Neb.	17.00	30.00– 40.00
Philadelphia, Penn.	15.50	
Portland, Ore.	12.00	22.50– 55.00
Prairie du Chien, Wis.	14.00	22.50
Rapid City, S. D.	18.00	25.00– 40.00

(a) Delivered on job; 10.00 f.o.b. plant.

Fullers Earth

Prices per ton in carloads, f.o.b. Florida shipping points. Bags extra and returnable for full credit.

16– 30 mesh	20.00
30– 60 mesh	22.00
60–100 mesh	18.00
100 mesh and finer	9.00

Stone-Tile Hollow Brick

Prices are net per thousand f.o.b. plant.

	No. 4	No. 6	No. 8
Albany, N. Y.*†	40.00	60.00	70.00
Asheville, N. C.	35.00	50.00	60.00
Atlanta, Ga.	29.00	42.50	53.00
Brownsville, Tex.		53.00	62.50
Brunswick, Me.†	40.00	60.00	80.00
Charlotte, N. C.	35.00	45.00	60.00
De Land, Fla.	30.00	50.00	60.00
Farmingdale, N. Y.	37.50	50.00	60.00
Houston, Tex.	35.00	45.00	60.00
Jackson, Miss.	45.00	55.00	65.00
Klamath Falls, Ore.	65.00	75.00	85.00
Longview, Wash.		55.00	64.00
Los Angeles, Calif.	29.00	39.00	45.00
Mattituck, N. Y.	45.00	55.00	65.00
Medford, Ore.	50.00	55.00	70.00
Memphis, Tenn.	50.00	55.00	65.00
Mineola, N. Y.	45.00	50.00	60.00
Nashville, Tenn.	30.00	49.00	57.00
New Orleans, La.	35.00	45.00	60.00
Norfolk, Va.	35.00	50.00	65.00
Passaic, N. J.	35.00	50.00	65.00
Patchogue, N. Y.		60.00	70.00
Pawtucket, R. I.	35.00	55.00	75.00
Safford, Ariz.	32.50	48.75	65.00
Salem, Mass.	40.00	60.00	75.00
San Antonio, Tex.	37.00	46.00	60.00
San Diego, Calif.	35.00	44.00	52.50

Prices are for standard sizes—No. 4, size 3½x4x12 in.; No. 6, size 3½x6x12 in.; No. 8, size 3½x8x12 in. *Delivered on job. †10% disc.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4 in.	6 in.	8-in.	10 in.	12 in.	15-in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Grand Rapids, Mich. (b)		.13½	.21	.31½	.40½	.64	1.00			1.80							
Culvert				.60	.70	1.00	1.20			1.80	2.10	2.25	3.35	4.00	5.60	6.90	7.85
Indianapolis, Ind. (a)				.75	.85	.90	1.15			1.60		2.50					
Newark, N. J. (d)					.85	.95	1.25	1.40	1.56	2.09	2.30	3.15	4.05	5.15	6.35	7.65	
Norfolk, Neb. (b)				.90	1.00	1.13	1.42			2.11		2.75	3.58		6.14		7.78
Tiskilwa, Ill. (rein.)				.7[illegible]	.8[illegible]	.9[illegible]	1.20	1.60		2.00		2.75	3.40		6.50		10.00
Tacoma, Wash.	.15	.17	.22½	.30	.40	.55	.70			1.81		2.47	3.42	4.13	5.63	6.49	7.3[illegible]
Wahoo, Neb. (c)					.85½		1.14										

(a) 24-in. lengths. (b) Sewer, 21-in., 1.40. †21-in. diameter. (c) Reinforced, 15.40 per ton, f.o.b. plant. (d) Reinforced.

News of All the Industry

Incorporations

Richmond Sand Co., Wilmington, Del., $100,000.

Newport Quarries, Newport, N. Y., $50,000.

Universal Plastering Co., Inc., Providence, R. I., 300 shares common, no par value.

Landa Sand and Gravel Co., New Braunfels and Austin, Tex., $30,000. Harry Landa, Cuthbert Westbrook and S. L. Costley.

Vincennes Sand and Gravel Co., Inc., Vincennes, Ind., 120 shares, par value $100 each. J. L. Byers, C. E. Byers, E. H. Byers and Ramond Soden.

Hot Springs Stone Co., Hot Springs, S. D., $75,000. Henry Dering, Walter J. Beck and Clifford A. Wilson, all of Hot Springs.

Batavia Washed Sand and Gravel Co., Batavia, N. Y., $20,000 preferred and 600 shares common. W. J. Darch, Batavia, N. Y.

Nellen Black Granite Co., Ashland, Wis., 250 shares at $100 each. A. T. Pray, O. Seestrom and A. J. Pardee.

Triangle Concrete Products Co., Dover, Del., $50,000. M. S. Cook, A. L. Raughley and J. M. Townsend.

Prairie Sand Co., Cleveland, Ohio, 100 shares, no par value. W. T. Findley, H. C. Koontz and M. A. Heman.

S. A. McCune Block Co., Hanover, N. J., $50,000. To manufacture cement blocks. Herman M. Cone, Morristown, N. J.

Arkansas Bauxite Co., Little Rock, Ark., $25,000. To develop bauxite deposits. John F. Evans, 513 East Third St., Little Rock, Ark.

Advance Cast Stone Co., Milwaukee, Wis., 120 shares at $100 each. A. Roth, B. Garni and E. Leipold.

Highland Sand and Gravel Co., Boston, Mass., 20,000 shares no-par stock. George S. Wilbur, Boston, Dexter B. Pattison, Dedham, Mass., and Roy J. Foster, Belmont, Mass.

Central Rock and Sand Co., Inc., Kingsport, Tenn., 1000 shares, no par value. H. C. Brooks, W. R. Jennings, C. E. Brooks, J. M. Cross and R. M. Blanchard.

Venice Art Marble Co., Inc., of Texas, San Antonio, Tex., $20,000. To manufacture cement tile, marble and terrazzo. Peter Brescancini, James Taylor and Clifford S. Stephens.

Western Massachusetts Sand and Gravel Co., Inc., Westfield, Mass., 2000 shares common. Robert P. Lane, president; Harold W. Augerson, vice-president, and Harry W. Gladwin, treasurer.

Rockport Paving Block Corp., Rockport, Mass., 120 shares common, no par value. To deal in granite, stone, paving blocks, etc. Geo. D. Rogers, Louis A. Rogers and C. Harry Rogers, 23 Granite St., Rockport.

Sand and Gravel

Sturm and Dillard Co., Circleville, Ohio, has donated gravel valued at $300 to the Berger hospital commission for building a road to the hospital.

The Koch Sand and Gravel Co., Mt. Vernon, Ind., announces a reduction in the price of both sand and gravel to $1 per cu. yd. This price became effective May 1.

Chinook, Mont.—The gravel plant here is again in operation and is supplying gravel for the Great Northern's concrete work around bridges and culverts and for relining tunnels on the Butte division.

Northern Gravel Co.'s old gravel pit south of Barton, Wis., on the Northwestern road, is to be sold for factory sites, if plans of the owners materialize. The tract is extensive enough to accommodate a number of large factories.

Montgomery Gravel Co., Montgomery, Ala., is to have a new unit to replace a part of its plant at Montgomery. The new plant will be of steel construction and will be equipped with mechanical vibrating screens to turn out gravel to any specifications.

Charlestown Sand and Stone Corp.'s plant at Charlestown, Md., was partially destroyed by a fire of unknown origin on May 4. A building on the property, formerly used as a pumping station, was completely destroyed, but firemen reached the operation in time to prevent the fire from spreading to the surrounding property.

Ted McKinney and Son, Sheridan, Ind., has been awarded contract by the Tipton, Ind., commissioners for 20,000 cu. yd. of gravel to be delivered in 1931 at a cost of $22,000. The contract carries the condition that the council at its coming meeting make an appropriation to cover the cost, which will be $1.10 per cu. yd. at the pit, located on what is known as the Thompson farm, northeast of Boxley.

Quarries

Finch Stone Co., Carmi, Ill., has been purchased by William Roth.

Casey Lime and Stone Co., Casey, Ill., is installing new machinery at its quarry.

The Blaire Granite Quarries, Inc., of Ashland, Ore., has been authorized to sell 1000 shares of common stock, par value $100 each.

South Texas Stone Co. is a new quarry company formed at Houston, Tex., and sponsored by R. M. Amrine, who has resigned as vice-president of the Bedford-Carthage Stone Corp., Houston, Tex.

Salisbury, N. C.—A 67-acre tract of land in Rowan county here, containing deposits of gray and pink granite, has been purchased by B. F. Coggin and C. Comolli of the Georgia Granite Corp. Development of the property will begin at once, it is reported.

Sunland, Calif.—The city council has denied the application of Sol J. G. Godman for the establishment of a rock crushing plant in the vicinity of Sunland, basing its opposition to the plant on the petition of property owners adjacent to the proposed rock crushing site.

Bluffton Stone Co.'s building operations at Bluffton, Ohio, are nearing completion. The principal building containing the screens and bins has been finished and construction work has now started on the crusher building. Officials of the company state that they expect to start production by July 1.

Tressel Stone Co.'s quarry and stone crushing plant north of Ada, Ohio, is now to be known as the Taylor Stone Co. J. G. Tressel has sold his interest to E. C. Taylor. Mr. Taylor has held an interest in the plant for seven years and has been active in its management.

Cement

Southwestern Portland Cement Co.'s plant at Osborn, Ohio, was visited recently by 175 members of the Springfield (Ohio) Builders Exchange. Before inspecting the plant the party were guests of the company at an outdoor dinner served in front of the company offices. Wm. Jennings, general manager of the company, welcomed the assembly and later gave an address on cement manufacture and the history of the industry.

Lime

Haden Lime Co., Houston, Tex., announce the election of O. R. Seagraves of Houston and W. L. Moody III of Galveston, Tex., to the board of directors of the company.

Sewell Lime Co., Orofino, Idaho, is now employing 12 men at Lime Mountain, Idaho, getting ready for its operations here. J. M. Molloy, manager of the company, states that the deposits have been inspected by various geologists and experts, and the lime rock found to be of an exceptional quality.

Gypsum

Certain-teed Products Corp., New York City, at the recent board of directors meeting elected W. W. Salmon and Charles F. Payson directors of the company to fill two vacancies on the board.

Gypsum Lime and Alabastine Co., Ltd., Paris, Ont., Can., reports that sales for the first four months of this year are 13% in excess of sales for the same period last year, and that its business in central and western Canada is showing improvement.

United States Gypsum Co.'s Fort Dodge (Iowa) plant was recently inspected by members of the Teachers' Federation. The teachers visited all the divisions of the mill accompanied by guides who explained the process of manufacturing gypsum products.

Arizona Gypsum Plaster Co., Douglas, Ariz., is opening new quarries at Curtis, on the San Pedro river, 60 miles from Douglas. The crushing plant will have a capacity of 150 tons a day. Associated in the company are William Adamson of Douglas, A. K. Adamson of Los Angeles and Shelton G. Dowell, who is secretary-treasurer of the company.

Cement Products

Rome Ready-Mix Concrete Co., Rome, Ga., has let contract for a plant at First avenue and East First street, Rome, Ga., to cost approximately $10,000.

Indiana Lock Joint Concrete Pipe Co., Lafayette, Ind., announces the installation of a building supply yard to handle concrete block, common brick, face brick, cement, lime, vitrified sewer pipe, culvert pipe and drain tile.

Personals

Andrew J. Snyder has resigned from the Century Cement Corporation of Rosendale, N. Y.

E. A. Doyle, consulting engineer of the Linde Air Products Co., New York City, was elected president of the American Welding Society at its recent annual meeting.

Ford J. Twaits has been elected president of the Consolidated Rock Products Co., Los Angeles, Calif. Since the middle of March Mr. Twaits has been general manager and president pro tem. of the organization.

Scott Turner, director of the United States Bureau of Mines, Washington, D. C., will deliver the graduating day address during commencement exercises at the Colorado School of Mines.

J. Frank Davidson

J. Frank Davidson was elected vice-president and assistant general manager of the Jeffrey Manufacturing Co., Columbus, Ohio, at the recent directors' meeting. Mr. Davidson has been associated with the company since 1911, and prior to his election to the vice-presidency he held the position of assistant general manager, having previously served as purchasing agent in charge of purchases and stores. In addition to his position with the Jeffrey Manufacturing Co., Mr. Davidson is a director of the Ohio Malleable Iron Co.

Charles Brown, formerly manager of the Ft. Jefferson plant of the American Aggregates Corp., Greenville, Ohio, has been transferred to the Columbus, Ohio, plant. Employes of the Ft. Jefferson plant surprised Mr. Brown with a farewell party before his departure.

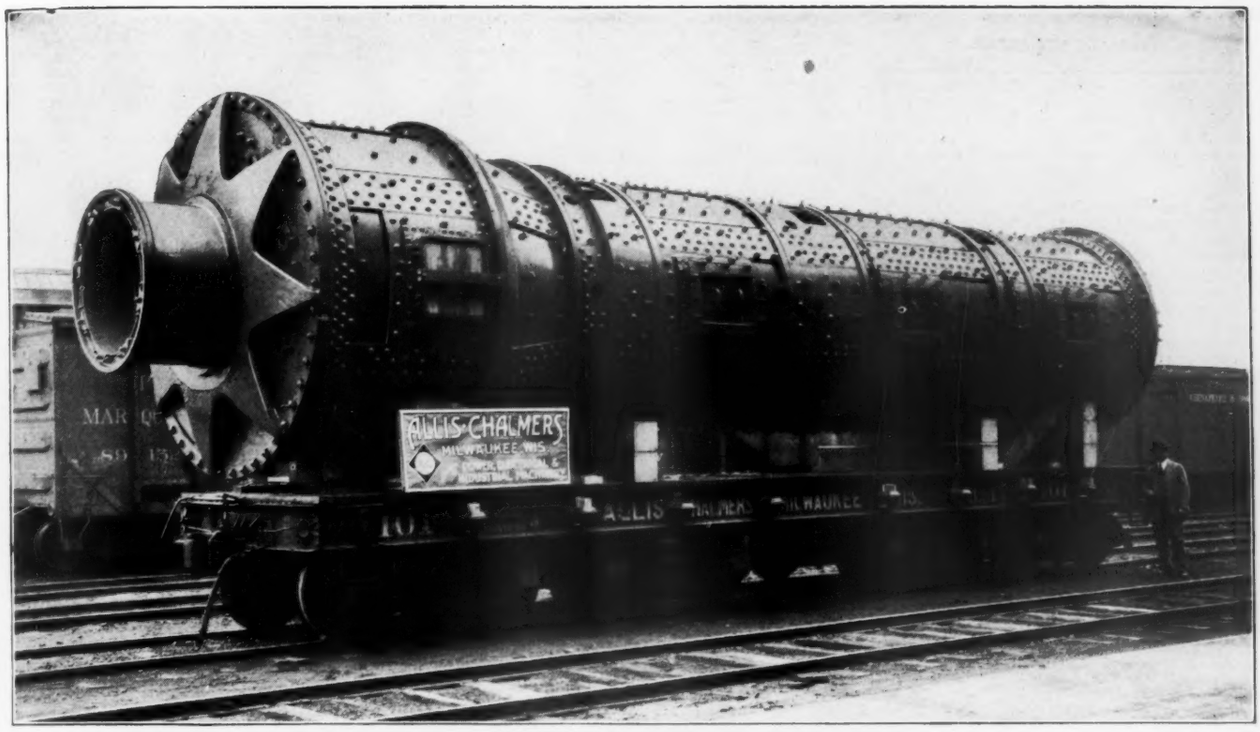
C. D. McCormick, formerly assistant advertising manager of the C. F. Pease Co., Chicago, Ill., has been appointed advertising manager to succeed W. Earle Pashley, now second vice-president and assistant sales manager. Mr. McCormick has been with the company for over four years and was previously connected with the Illinois Glass Co., Alton, Ill.

R. B. Crenshaw has been appointed district sales representative in the Chicago district for the Universal Power Shovel Co. division of the Unit Corp. of America, Milwaukee, Wis. Mr. Crenshaw was formerly district manager for the McMyler Interstate Co., and for the last two years has been in charge of the Detroit territory for the Ohio Locomotive Crane Co., Bucyrus, Ohio.

Obituaries

Charles H. Classen, 72 years old, president of the Maryland Lime and Cement Co., died May 5.

Edward Balf, West Hartford, Conn., president of the Edward Balf Co., paving contractors and dealer in trap rock, died May 8 at the age of 80. After organizing the New England Trap Rock Co. he obtained control of the Southern New England Paving Co. and the Hartford Trap Rock and Supply Co.



Compeb Mills

Shipped as Complete Units— are easily and quickly installed

The 9½′ x 8′ x 45′ Compeb Mill shown above is loaded on a special Allis-Chalmers four truck flat car. It will be shipped direct from the Company's works at West Allis to the cement plant for use in clinker grinding.

Compeb mills, shipped as complete units with all internal parts and both heads in place, are easy to install. Lift them from the cars and place them in the bearings. This greatly simplifies field erection, saving both time and expense.

Allis-Chalmers builds all the principal machinery, including electrical equipment, for cement, crushing, screening, and washing plants.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

When writing advertisers, please mention ROCK PRODUCTS

Manufacturers

Palmer-Bee Co., Detroit, Mich., has opened a district sales office in New York City at 30 Church St., Suite 308, in charge of H. W. Ruth.

Link-Belt Co., Chicago, Ill., advises that its Baltimore (Md.) office is now located at 913 Lexington Bldg. H. D. Alexander is in charge of this office.

Dobbie Foundry and Machine Co., Niagara Falls, N. Y., has appointed Brown and Sites Co., Inc., 30 Church St., New York City, as its New York representative.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., announces the new location of its Chicago district office at 20 North Wacker Drive Bldg., Suite 3101.

Merco Nordstrom Valve Co., Los Angeles, Calif., has opened an office in St. Louis at 317 North 11th St. under the management of Leonard J. Kanard.

Pennsylvania Pump and Compressor Co., Easton, Penn., announces the appointment of E. H. Bollenbacher, 725 Forsyth Bldg., Atlanta, Ga., as sales representative in the Atlanta district.

H. D. Conkey and Co., Mendota, Ill., announces that it has changed the name of its manufacturing division from H. D. Conkey and Co. to Conco Crane and Engineering Works division of H. D. Conkey and Co.

Harbison-Walker Refractories Co., Pittsburgh, Penn., is to inaugurate an expansion program covering plant improvements to be made in all of the five districts in which the company operates, including Pennsylvania, Ohio, Missouri, Illinois and Alabama.

Lincoln Electric Co., Cleveland, Ohio, has moved its Baltimore, Md., distributor's office from 432 North Calvert St. to 600 North Calvert St. T. A. Canty is in charge of distribution in this territory. R. Rude has been appointed office manager and C. N. Hilbinger sales and service manager.

Bucyrus-Erie Co., South Milwaukee, Wis., has been awarded contract by the Anglo-Chilean Consolidated Nitrate Corp. for 12 dragline excavators and 12 high-lift shovels for the new Chilean plant of the Lautaro Nitrate Co., now under construction.

Brown Instrument Co., Philadelphia, Penn., announces the consolidation of its Chicago sales office and Midwestern factory branch in new quarters at 155 East Superior St., Chicago, Ill. The new quarters provide considerably more space and enable the company to carry on hand a large stock of replacement material.

Wagner Electric Corp., St. Louis, Mo., has added Albert Shaw to its Salt Lake branch office sales force. Mr. Shaw is a well-known mining engineer and has been connected with the United States Geological Survey, and more recently superintendent of a Utah coal mine. Mr. Shaw will specialize on coal and metal mining industries throughout the Salt Lake branch office district.

Trackson Co., Milwaukee, Wis., has appointed the following new distributors to handle Trackson tractor equipment for McCormick-Deering tractors: Gierke-Robinson Co., Fourth and Ripley Sts., Davenport, Ia., who will cover the Davenport, Des Moines, Cedar Falls, Fort Dodge, Mason City and Dubuque territory, and Zimmerman-Steeples Equipment Co., 269 East Water St., Portland, Ore., for the Oregon territory.

Foote Bros. Gear and Machine Co., Chicago, Ill., at a directors' meeting held recently elected the following additional officers: C. C. Commons, first vice-president and assistant secretary; F. A. Emmons, vice-president in charge of gear and reducer sales and advertising; H. H. Bates, vice-president in charge of road machinery division; W. A. Barr, vice-president in charge of manufacturing; W. J. Heineman and W. O. Bates, Jr., assistant vice-presidents.

American Manganese Steel Co., Chicago Heights, Ill., announces that the Southern Manganese Steel Co., which until recently was operated as a subsidiary of the American Manganese Steel Co., has now become a part of the company and will be known as the Southern Manganese Steel Division of the American Manganese Steel Co. Offices have been opened in the Law and Finance Bldg., Pittsburgh, in charge of W. G. Hoffman, where the sales of both Amsco manganese steel castings and Fahralloy castings will be handled.

Union Carbide Co., New York City, announces that the units of the corporation in Kansas City—the Linde Air Products Co., the Prest-O-Lite Co., Inc., Oxweld-Acetylene Co., and the Union Carbide Sales Co.—are now housed in the 11-story Carbide and Carbon Bldg. at 910 Baltimore Ave., Kansas City, Mo. In addition to having its district offices here, Oxweld-Acetylene Co. will maintain apparatus and supply stock in the basement of the building. Other units of the corporation, J. B. Colt Co. and the National Carbon Co., Inc., will also maintain Kansas City offices in the building.

Republic Steel Corp., recently formed with the merging of several steel companies, as announced in the April 26 issue of ROCK PRODUCTS, announces the following executive sales appointments: A. E. Walker, former general sales manager of the Republic Iron and Steel Co., becomes assistant vice-president. J. M. Schlendorf, formerly vice-president in charge of sales of the Central Alloy Steel Corp., will assume duties as sales manager of alloy steel products. Norman Foy, Birmingham district manager in the old Republic organization, becomes sales manager of mild steel products, with headquarters at Youngstown, Ohio.

Moser and Cotins, Utica, N. Y., **Picard, Bradner and Brown**, New York City, and the **Lyon Advertising Agency**, New York City, have consolidated their advertising agency services to form the new corporation, "Moser and Cotins, Brown and Lyon, Inc." Officers of the new company are Theodore E. Moser, president; Arthur S. Cotins, vice-president and treasurer; Lee D. Brown, vice-president, and James B. Lyon, vice-president and secretary. The two New York agencies combine their facilities in the Graybar Bldg., New York City. This complete agency unit will be under the management of Messrs. Brown and Lyon. The present agency of Moser and Cotins continues as a complete unit at 10 Hopper St., Utica, N. Y., under Messrs. Moser and Cotins.

Phoenix Manufacturing Co., Joliet, Ill., has purchased and taken over from the Graver Corp. its steel tank, water-treating and steel plate construction business, including the plant at East Chicago, Ind. The Phoenix company will operate this plant and business under a wholly owned subsidiary company, to be known as Graver Tank and Manufacturing Corp. The plant at East Chicago has a fabricating capacity of over 40,000 tons of steel per year. The Graver brothers will come over with the new interests and will be part of the official staff of the new Phoenix subsidiary. The new company will maintain branch sales offices in Chicago (28 East Jackson Blvd.), New York, Dallas, Tex., St. Louis, Mo., San Francisco, Calif., and several other large centers. General offices will be at East Chicago, Ind. Officers of the new corporation are Edward N. Gosselin, president; F. C. Everitt, vice-president and general manager, and R. E. Meyer, secretary and treasurer.

Manitowoc Engineering Works, Manitowoc, Wis., has appointed the following new distributors for the promotion and sale of Moore Speedcranes, shovels, draglines and trenchoes: Edgerton and Sons Co., 585 Hosatonic Ave., Bridgeport, Conn.; Hudson Valley Welding Co., 7 Buckingham Ave., Poughkeepsie, N. Y.; W. A. Ward, Hillsdale, N. Y.; James Beales, Jr., Box 445, South Berch, Conn.; Ilium Truck and Equipment Co., Inc., 2 Oakwood Ave., Troy, N. Y.; Contractors Machinery Co., Kansas City, Mo.; J. B. Harbison Equipment Co., Little Rock, Ark.; Northfield Iron Co., Northfield, Minn.; J. C. McDonald, 2104 Webster St., Omaha, Neb.; Contractors Machinery and Supply Co., 318-20 Penn Ave., Pittsburgh, Penn.; La Lance Equipment and Supply Co., Huntington, W. Va.; Richmond Machinery and Supply Co., Richmond, Va.; J. W. Hodge, 1334 N. Highland Ave., Atlanta, Ga.; Harvard Turnbull and Co., Excelsior Life Bldg., Toronto, Ont.

Hewitt-Gutta Percha Rubber Corp., Buffalo, N. Y., has completed one full year without a lost-time accident. The record is a remarkable one in view of the fact that during the preceding 16 months there were 30 lost-time cases reported, most of them of a minor character, but sufficient to keep the operator from working. The company has been carrying on an intensive educational campaign for safety. Equipment has been carefully guarded, operators have been taught the safe way of doing things, and committees, both of the workmen and the management, keep the thought of safety actively before the employes at all times. Departmental meetings are held every month on company time, during which concrete cases are discussed, particularly the hazards of that particular department. At first these meetings were conducted by the management, and even outside speakers, but now the campaign has progressed so far that many meetings are conducted with one of the operators as the chief speaker. The new objective set by the employes is a continuous record of two years without a lost-time accident.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Grinding Mills and Dryers. A new folder describing Hardinge conical ball, pebble and rod mills and Ruggles-Coles dryers. HARDINGE CO., York, Penn.

Crushers. A new folder giving a partial list of Traylor equipment furnished to prominent mining companies by TRAYLOR ENGINEERING AND MANUFACTURING CO., Allentown, Penn.

Concrete Plants. Bulletin **No. 180** describing and illustrating Butler commercial concrete plants for the mixed-in-transit method of manufacture. BUTLER BIN CO., Waukesha, Wis.

Heating. Bulletin **No. 9218**, covering the Venturafin unit heaters for floor, wall or ceiling mounting—high, medium or low pressure steam applications. AMERICAN BLOWER CORP., Detroit, Mich.

Testing Screen. Construction, assembly and operation of the Weston testing screen for testing coarse materials are described in a folder of the HENDRICK MANUFACTURING CO., Carbondale, Penn.

Shovels. Bulletin illustrating and describing the Universal ½-yd. machine for light and finish grading, for trimming slopes, building culverts, unloading cars, etc. THEW SHOVEL CO., Lorain, Ohio.

Crawler Wheels. An attractive 8-page circular describing the outstanding features of the new Trackson crawler wheels, built for mounting on various makes of wagons, trailers, etc. TRACKSON CO., Milwaukee, Wis.

Portable Crushing Plant. Folder outlining the advantages of Wheeling portable crusher with bucket elevators, designed particularly with the idea of easy transport or portability. WHEELING MOLD AND FOUNDRY CO., Wheeling, W. Va.

Testing Machines. Advance bulletin illustrating and describing a few representative models of light, medium and heavy-duty testing machines and special testing equipment with the Emery Weighing System. SOUTHWARK FOUNDRY AND MACHINE CO., Detroit, Mich.

Fire Brick. Attractive folder describing the new tuunel kiln unit of the A. P. Green Fire Brick Co., illustrating various processes in the manufacture of fire brick and giving a detailed description of the methods of controlled drying and burning. A. P. GREEN FIRE BRICK CO., Mexico, Mo.

Glacial Sands and Gravels. Circular **No. 5**, a reprint of a series of articles which appeared in the National Sand and Gravel Bulletin, entitled "The Story of Glacial Sands and Gravels," by Harold O. Whitnall, professor of geology, Colgate University. NATIONAL SAND AND GRAVEL ASSOCIATION, Washington, D. C.

Concrete Products Machinery. New booklet covering Besser complete line of concrete products machinery and equipment, including three types of automatic strippers, the Master Tamper, concrete brick machines and cars for concrete products plants. BESSER MANUFACTURING CO., Alpena, Mich.

Quarry Plants. Bulletin **No. 267-B** describes several different quarry plant designs, discusses at length the advantages and disadvantages of the different plant layouts, and gives a list of the necessary equipment and power requirements for each type of plant. SMITH ENGINEERING WORKS, Milwaukee, Wis.

Pneumatic Conveying. Bulletin **No. 519** contains a reprint of an article by John F. Barnard, chief engineer, U. S. Industrial Chemical Co., on "Cutting Handling Cost in Shipping Potash," and Bulletin **No. 605** lists some Dracco pneumatic conveying installations, the materials conveyed, etc. THE DUST RECOVERING AND CONVEYING CO., Cleveland, Ohio.

Resistance of Threads to Shock. Report **No. 2162A** is a supplemental report to report No. 2162 on the "Comparative Shock Resistance of Standard V Thread and Nut Connections and Dardelet Thread and Nut Connections" made by the testing laboratories of the Department of Civil Engineering, Columbia University. DARDELET THREADLOCK CORP., 120 Broadway, New York City.

Steam Shovels. Interesting circular carrying the caption "Ten Billion Dollars!" showing excerpts from various highway publications and newspapers to indicate that $10,000,000,000 will be expended in construction work in 1930, and urging rock producers to get their plants ready to share in this business. The circular illustrates and describes important features of Marion quarry shovel design. THE MARION STEAM SHOVEL CO., Marion, Ohio.

Water Supply Systems. Bulletin **No. 111** giving the history and advantages of the pneumatic water system; assembly and layout suggestions in both single and duplex units, and suggestions as to different kinds of pumps that may be used on various jobs. The bulletin features the "Vibrestor" hose connections, and sub-base, and the "Shok-A-Restor" designed to make the installation more quiet than it has been in the past. It also includes engineering tables and specifications. CHICAGO PUMP CO., Chicago, Ill.

Quarry Cars. Bulletin **No. 210** devoted to cars and truck bodies for the haulage of stone and other mine and quarry products. Catalog covers various types of Easton cars, including the Phoenix car, Won Way, Granby, Matson, Rocker Dump and Gable Bottom cars. Construction features and the operations to which each particular type of car is best adapted are outlined. A section is devoted to the truck and trailer system of transportation in quarries. EASTON CAR AND CONSTRUCTION CO., Easton, Penn.